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A Consolidation of Engineering News, Engineering Record, The Sanitary Engineer, and The Contractor

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Contents for August 1, 1929

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Structural Features of a Tall Building Tower and Its Wind System.....162
DESCRIPTION of the extension to the office building of the Consolidated Gas Company in New York City.

Frisco Line Builds a 293-Mile Extension to Tidewater.....168
LARGE inland railway system gets an outlet on the Gulf and rebuilds dilapidated short line.

Economical Proportions of Storage Tanks.....171
ANALYSIS of the related factors of surface, weight and costs when considered for any given volume. BY ROBINS FLEMING

Lining Keeps Up With Driving on Water Tunnel.....173
BOTH OPERATIONS proceed simultaneously on the Waterville hydro-electric development in North Carolina.

Simple Method of Varying Head in Testing Drainage Pumps.....177
PARTIAL BREAKING of vacuum at manhole gives increased head without waiting for change in water level. BY JOHN G. SUTTON

Increasing Height of Small Dam for New Canaan Water-Works.....179
EARTH DAM with masonry core wall raised second time without sacrifice of storage or interruption of service. BY O. H. MARCHANT

Sewage-Works Operation at Worcester, Mass.—II.....180
SECOND of three articles summarizing experiences, results and lessons of four years' experience. BY ROY S. LANPHEAR

Contractor Held Liable for Use of Creosote Substitute.....184
COURT finds substitution "fraudulent" in treatment uses on wood piling for San Diego amusement pier.

Steel Arch of 800-Ft. Span to Cross Ohio River.....185
CONSTRUCTION begun on large highway bridge to connect McKees Rocks with northern districts of Pittsburgh.

Engineering Features of Flood-Control Plan Not Subject to Change by President.186
ATTORNEY GENERAL rules that Mr. Coolidge's approval of special board report fixed the procedure.

Editorial 159
Letters to the Editor.....187
News of the Week.....188
Construction Equipment and Materials....193
Business Side of Construction.....195
Current Prices of Construction Materials..198

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APPRAISALS

THE decision of the United States Supreme Court in the O'Fallon case states that the "cost of reproduction must be considered in determining value." In the Indianapolis Water case, also, the Supreme Court emphasized the importance of reproduction cost and of determining depreciation by field inspection.

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DEVOTED TO CIVIL ENGINEERING AND CONTRACTING

F. E. SCHMITT, *Editor*

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Helping Government

CARRYING forward the reorganization of the American Engineering Council which followed the joining of the American Society of Civil Engineers early this year, the Council has set up a number of committees to co-operate with Congress in the study of engineering problems. It has had such committees heretofore, but the enlarged resources which result from the reorganization should make it possible to extend their advisory service greatly. As now organized, the work is of high promise, the more so in view of the standing of the men named to serve on the committees. It may not be overlooked that there are difficulties: on the one hand, to keep the advisory work free from lobbying tendencies, and on the other hand to place the work on so broad a basis that it will fairly reflect and represent the views of the entire constituent profession. If both these objects can be met in highest degree, engineering can truly assist government and the country will be the gainer.

Unusual Tunneling

LINING a tunnel simultaneously with the driving is common in railroad work, but is rarely resorted to on water tunnels because of their small size. In driving a six-mile tunnel for the Waterville hydro-electric project on Pigeon River in North Carolina the usual method of holing through and then lining was precluded by a contract time limit. How the contractor met the time requirements by developing a special jumbo permitting concrete lining without interference with muck trains despite cramped quarters in a 14-ft. bore is told on another page of this issue. The equipment and methods used on this work deserve the reader's attention. The annual mileage of small-character rock tunnel operations far surpasses that of railway tunnels, and compared with practice in the larger bores their mechanization and their organization for quantity production of heading and lining are backward. The Waterville tunnel is an example of the fact that the small tunnel for carrying water gives an opportunity for skill and ingenuity of the highest order when the tunnel builder is encouraged to exercise his wits.

Playing Square

OLD contractors have keenly in memory the time not so long ago when the nefarious practice of "shopping around" by owners and engineers after bids had been received and privately opened was common practice. A contractor would be quietly informed that he was favored and could have the contract by meeting the bid of another, supposedly the low bid. Most likely the low bidder would be approached in the same manner, and as a result two or more contractors would be pitted against each other by the owners in an effort to beat down the original bid prices. This practice has been practically stamped out among owners. Today it is far more prevalent within than it ever was outside the ranks of contracting. How many general contractors, after securing a contract, accept the original low bid submitted by a subcontractor, although that bid was used in making up the general bid? Having received a contract, how many contractors refrain from attempting to beat down material dealers' prices submitted as the bids were being estimated? A representative of a large highway contracting firm recently made the remark that he has yet to pay the material prices submitted to him before getting the contract. An uproar of protest would result from a statement by a railroad company's chief engineer to the effect that he has never accepted an original low bid. Shopping with subcontractors and material dealers after securing a contract may be classed as shrewd business, but it is just as unfair as the tactics practiced formerly by many owners and engineers in dealing with contractors. It is encouraging to note that a trades committee including representatives of the A.G.C. and each of the prominent subtrades has recently been formed to remedy this situation. With contracting complaining of poor business, too low bids and other ills, any practices tolerated from within tending to produce unhealthy business conditions should be corrected.

Public Service Problems

SEVERAL questions of public service are rather intricately intermingled in the case of the Long Island Railroad application for authority to abandon its Whitestone branch in New York City. A prosperous railroad seeks to close a non-remunerative branch, though many people depend on it for daily transportation and supply. The branch was laid out decades ago and would probably be a doubtful project today. Yet as the people along its rails contributed to building up the system and went there because of the existence of the branch, the question arises whether they can fairly be deprived of the service. It can hardly be claimed that every railroad branch individually should show profitable earnings—at least many feeder lines do not. But if in this respect the case bears on the right and duty of a railroad line to exist, on the other hand it involves also the question of how far a railroad is obligated to provide for purely intramural passenger traffic. The branch is wholly within the city limits and its territory is served by other transit means. The terminal and other facilities of the Long Island Railroad are hardly proportioned for city rapid transit traffic, nor is the trackage of the branch itself designed for such service. Mass transportation of passengers in cities has become so thoroughly specialized, and so differentiated from main line railroad traffic, that both in physical equipment and in operating methods the two are necessarily distinct. Were the line taken over for integration in the city's rapid transit system, therefore, its service could be more properly co-ordinated,

although present freight requirements would be left uncared for. In more than one way the case of this branch line brings together some difficult and as yet unsolved problems of both railroad and urban transportation development. Its ultimate adjustment may throw a helpful light on the problems of both kinds.

Unnecessary Losses

WHEN a fire swept down the slopes of Mount Tamalpais a short time ago, fire fighters hurried from San Francisco to help Mill Valley turn the conflagration away. But they found that their hose threads would not fit the threads of the Mill Valley hydrants, and so their readiness to help was largely ineffective. Many houses were burned down, with a loss total that is placed in the millions. All this could happen in spite of the fact that standard hose threads were agreed on in 1905 and standardization work has been in progress for eight or nine years; constant effort has since been put forth to awaken all communities to the importance of standardizing their hose and hydrant threads. Yet more than one-half of the 10,000 communities which have fire protection have not yet standardized their threads. In the face of such happenings as at Mill Valley, the importance of systematic and energetic work in extending the standardization of hose couplings is strikingly evident. Conversion of threads, either by recutting with special tools, by provision of new fittings or by the use of adapters, is a simple process, and its value has been amply demonstrated time and again—for example, in the Fall River conflagration of last year, when the help of outside fire departments was of critical importance in checking the spread of destruction. Unstandardized fire connections mean unnecessary losses, as Mill Valley has learned.

Mississippi Flood-Control Law and Fact

THE opinion of the Attorney General published in this issue that the engineering plan for Mississippi flood control is fixed beyond modification "except as provided in the project itself" or "by any authority save the Congress" is presumably good law. It does not meet a situation that has brought forward protest by high engineering authority and from Senators and Representatives speaking for the people most directly concerned in flood protection. Nor does it bring conviction that executive authority is helpless in the face of a law that places the direction of a public work in the hands of a bureau of the government. In view of the opinion, therefore, the obligation resting on the President is even more urgent than before, and he has need of both vision and courage in greater degree.

What does Mr. Mitchell say? He solemnly proclaims the obvious in stating the well-known fact that the flood-control act adopted the Jadwin plan of construction, subject to a special board's comparison of its engineering features with those of the Mississippi River Commission plan. The board's recommendation in favor of the Jadwin plan having been approved by the then President, the terms of the act are in full force. All this was known.

Question had been raised as to whether President Coolidge's reservation with regard to flowage damage payments left the approval incomplete; on this point the Attorney General does say something new, asserting that the President had no power to make reservation on this point because the board was not authorized to consider anything but engineering features of the two plans. Of course the truth is that the board did consider damage and payment matters and that its approval of the Jadwin plan was, in fact, closely interwoven therewith; but Mr. Mitchell's legal mind easily overlooks this fact.

Due to ignorance, no doubt, Mr. Mitchell uses the general term "engineering features" with no clear understanding of what it means. The so-called Jadwin plan was by no means something that could be executed direct; a vast amount of detail had to be filled in. This was done by the army engineers. Has the President power to review this new detail, and assure himself that it is correct and economical? Mr. Mitchell, while not committing himself, implies by his denial of any presidential right of review that he has not such power. If only by expansion, General Jadwin and his subordinates have changed the "plan" as laid down in the drawings of the report which Congress adopted; possibly the changes are desirable, but they are *changes*, and they may merit review by impartial authority. May the General change the plan, though the President may not? And if so, is the President powerless to review such change?

The most important element of the Jadwin plan is the "fuse-plug" levee. Its location, height, length and construction were described only in vaguest outline in the flood-control act. The Chief of Engineers now details the "fuse-plug" in specific new plans; is the President powerless to review the new features embodied in these details, or to inquire whether they are dangerous? The undefined widths and locations of the plan's floodways, subsequently made definite by the army engineers—are they beyond scrutiny by the President, that he may become assured of protection for the valley? And again, the floodway levees as detailed in contract plans for bidding do not match the levee lines as drawn in the plan—may the President not review these changes, with their far-reaching effect on the welfare of the local people?

It will be recalled that the protests which ultimately led to the legal opinion in question were aroused by the Chief of Engineers' intention to make a hurried start on the floodway levees in the face of widespread engineering doubt of the soundness of the detail plans. The protests were not directed against the plan adopted by Congress, but against the extension and application of that plan by the army engineers. When the President was asked to delay the beginning of work on these floodways, it was known that the plan adopted by Congress did not contemplate that these floodways be built first, or at any specific time. Nor does the Attorney General's opinion refer to periods of construction any more than did the act of Congress. Clearly then, the President may order delay on this element of the work. And further, in so far as he is executive head of the government, he may without doubt inquire into the necessity for undertaking the floodway work at this time; that is, to this extent at least he may "review" General Jadwin's actions.

So far as the critical issues of the case are concerned, the Attorney General's opinion affords a negative help. It denies in no way the President's right to review, or to order reviewed, those elements of the army engineers' work which lie beyond the adopted plan or are not specifically prescribed thereby. Nor does it deny his power to postpone the strongly protested floodway construction in order that national money may not be wasted in doubtful and perhaps destructive undertakings before

Congress can find time to reconsider the terms of its hastily passed act. Thus, it places the present responsibility squarely upon Mr. Hoover.

Designing Buildings to Resist Wind

NEARLY three years have passed since the Miami hurricane of 1926 and two years since its lessons were summed up by the special committee appointed for the purpose by the American Society of Civil Engineers. During that period the average roof level of tall buildings in our larger cities has been rapidly pushed upward. Structures have become narrower and taller, with the result that wind forces have become increasingly important. Further, this importance is intensified by the fact that structural experience in the Florida storm raised challenging questions about many of our current designing theories. It showed with startling clearness that mere designing to building-code requirements will not necessarily make a structure proof against storm.

We now must ask whether the tall buildings recently built have benefited from the lessons learned in 1926. As with most such general questions, there is no all-inclusive answer that is very revealing; some new buildings are much better structures as a result of new knowledge, others have been built in which wind received no more than cursory attention.

Whether or not new and enlightened methods of wind design have been utilized, it is certain that they have not received the publicity they deserve. Briefly, there is too much satisfied silence about methods of designing tall buildings against wind. In too many discussions, papers and articles on tall buildings the subject is dismissed by describing the type of beam-to-column connections used. There can be little doubt that developments of the next decade will lift wind forces to a position of pre-eminence, requiring the fullest possible discussion and perhaps a codification of knowledge. Yet, in striking contrast, the designer of one of the tallest buildings in New York City not long ago refused to divulge the method of wind design used, claiming it represented part of his stock in trade—seemingly an impossible circumstance in this modern age, yet it actually happened.

That there are buildings whose design is based on modern concepts of wind forces is evident from the description in this issue of the new extension to the Consolidated Gas Building in New York City. A thoroughgoing attempt was made to secure rigidity. There may be designers who will question the manner in which this rigidity was secured, and others, perhaps, will disagree with other phases of the design, but no one can question the honesty with which the forces were assumed, translated into loads, distributed in the frame and carried to the foundation. It is important to note, also, that strength was assumed to be based first on stiffness, a premise resulting directly from Florida experience. Furthermore, the fact was accepted that wind design problems are not susceptible of exact mathematical analysis; the X-bracing was designed for what was thought to be sufficient strength to resist wind, and the column-to-beam connections were then made as stiff as possible as an added precaution.

Recognition of the relation between stiffness and strength in tall buildings is a good beginning for a new consideration of wind design. It was revealed as a major factor in the successful resistance or failure of buildings in Miami, where the gusty character of the wind (which probably is a common characteristic of most winds, not confined to Florida hurricanes) subjected the buildings to a racking action which was destructive in inverse ratio to the stiffness of the structure. There are many other problems relating to wind and tall buildings—intensity of wind at various heights, distribution of forces as affected by shapes and exposures of the structure, wall action, floor action, the use of towers—which need to be studied and applied. With stiffness and strength accepted as closely synonymous, we shall be in a position to look carefully at some of the other factors. And an important consideration to keep in mind is that only by the broadest possible discussion of theories and designs, by casting more light on wind-designing methods, can we hope to make progress in correctly analyzing these various factors.

Dual Jurisdiction

DISCUSSION of the recently passed California dam control act has overlooked a special provision of decidedly unusual kind. It is a provision for cases in which state supervision and federal supervision of dams may overlap and is designed to avoid conflict in these cases. Such overlap appears possible because the mountain areas of California have something like 24,000,000 acres of national forest, within which are found most of the water-supply and water-power possibilities of the state, and here the Federal Power Commission has authority. Hence, unless the state authorities were to relinquish jurisdiction entirely, the necessity might arise for one of the two authorities to conform its requirements to those of the other. This is made possible by a clause of the new law as novel in character as it is skillfully devised for its purpose.

It is provided in this clause that if the requirements of the federal agencies should so conflict with the state requirements as to make it impossible to satisfy both, then the state requirements shall be modified sufficiently to permit of compliance with both requirements. It may turn out that this in effect is a waiver of the state control over dam safety in certain cases; but the form of the provision at least maintains the view that the state is entitled to exercise separate supervision. Moreover, the terms of the act seem to leave the state open to impose stricter requirements than those of the federal bureau, or the opposite, either of which possibilities may readily arise.

Applied with judgment and in co-operative spirit on both sides, this novel provision for dual jurisdiction will tend to increase the safety of dam construction. That it will place a somewhat heavier burden on those who undertake dam construction is apparent, for the vexation and delay of satisfying two separate authorities with independent sets of examiners and inspectors is well known. It would be a logical solution of the case, in view of California's determined assumption of the responsibility of seeing that all dams in the state are safe, were the Power Commission to confine its requirements to matters involving the use of federal lands and waters and leave the approval of engineering and other safety phases of the case to the control of the state. Failing such an adjustment, however, the dual control can yet be exercised without becoming too burdensome, so long as the two authorities apply themselves to their responsibilities in truly co-operative spirit. Federal and state jurisdictions have much to learn in the way of working together, but it can be done.

Structural Features of a Tall Building Tower and Its Wind System

Extension to Present Office Building of Consolidated Gas Company in New York Includes a 500-Ft. Structural Steel Tower of Monumental Appearance—Unusually Thorough Attempt to Secure Rigidity Against Wind—Stonework Matches Old Building—Connections Between Old and New Buildings

THE NEW extension to the Consolidated Gas Company's general office building in New York City occupies a conspicuous place in the city's new skyline. In addition, it includes numerous important factors of design and construction, prominent among which are a notable system of wind bracing in the tower portion and a generally thorough attempt to secure rigidity. Special connections between the old and the new steel work also were devised. The new construction is inclosed in Indiana limestone cut to match exactly the rusticated stonework of the old building, and in laying this stone particular care had to be exercised to keep the new joints lined up with the old.

FIG. 1—THE MONUMENTAL TOWER OF THE NEW CONSOLIDATED GAS BUILDING IN NEW YORK CITY

The existing Consolidated Gas building was also the subject of unusual structural interest at the time it was completed in 1913. The site was long and narrow and the middle of the length was occupied by a twelve-story building comparatively new at the time it was decided to cover the whole site with a nineteen-story building. The new structure was, therefore, built around and over the twelve-story building, that portion over the latter being suspended from heavy plate girders at the roof level of the new building. Deep relief architecture in the street faces of the building necessitated special framing, as it does in the recently completed extension. The original construction was described in *Engineering News,* Dec. 25, 1913, p. 1275.

Description of Extension—The completed part of the present extension, the west building, extends 122 ft. 7 in. along Irving Place and 204 ft. along East Fourteenth St. on the site formerly occupied by the old Academy of Music. It includes a 500-ft. tower 80 ft. square on the southwest corner of the site, the tower emerging from the main portion of the building at the nineteenth floor. There is now under construction and practically complete another extension eastward 116 ft. and eighteen stories high, as shown in Fig. 2, occupying the site of the old Tammany Hall.

An architectural consideration of importance was involved in locating the tower, which, as may be seen by Fig. 5, is set back from the building line above the third floor. Such an arrangement was stressed as lending proper perspective to the whole project, whereas it was believed that placing the tower flush with the corner would have given an appearance of unbalance. The first three floors are set flush with the building line in order that they may be utilized as showrooms and for an arcade.

The entire building is to be occupied by the general offices of the Consolidated Gas Company and its subsidiary properties. By and large, it is divided as ordinary office space, although there is included a large dining hall two stories high on the nineteenth floor; the long trusses over this hall support the roof of the main building except for elevator penthouses and tank rooms. In the tower the bottom of the clock face is at an elevation corresponding to the 27th floor, and above this level the available space is designed for elevator penthouse and storage rooms. The pyramidal top, the construction of which was characterized by much difficult construction and interesting design, is surmounted by a bronze lantern and aviation beacon.

Sixteen elevators serve the west building. Four of these in banks of two each are located in the central part of the tower. Two of this group go to the 24th floor and two reach the 27th floor. From the 27th floor to stage *G* (Fig. 6) a small auxiliary elevator is used. In the northeast corner of the completed west building are located twelve other passenger elevators arranged in four banks of three each, serving the first nineteen floors. Elevators are of the most modern type, have signal control, are self-leveling and utilize automatic doors. In the east building, now being finished, provision is made for six elevators, but only three are being installed at present.

General Framing Plan—The plan of the fourth floor is shown in Fig. 3. This is typical of other floors except that the outside rows of columns *A* to *F* along Irving Place and 1 to 6 along East Fourteenth St. are discontinued above this elevation, column *B2* forming the corner column of the tower.

The floor plan is divided into panels approximately 18 ft. square, and, in general, 12- and 15-in. I-beams frame in an east-west direction, while 18-in. wide-flanged girders are framed in a north-south direction; in the wind panels these girders weigh 87½ lb. and otherwise 50 to 60 lb. The columns in the lower stories are built up of plates, angles and covers, the maximum being 1-in. web with 8x6x1-in. flange angles and two 2½-in. cover plates, cold riveted. In general, the columns in the remaining portions of the building are rolled shapes.

Several special details are necessary to support the stonework. Fig. 4 shows the method of supporting the spandrel beams at the fourth floor, where a heavy cornice is carried. A knee bracket is placed outside of the column, and in order to eliminate bending in the column, a double channel tie connects the column to the floor framing on the inside. On the nineteenth floor another heavy spandrel detail occurs to carry the stone ornamental coping. This is carried by 8x6x$\frac{9}{16}$-in. angle outriggers about 6 ft. long anchored to an 18-in. I-beam, which lies across the floor beams. Typical spandrels in the tower utilize girders made up of 36-in. web plates and four angles 4x4x½ in., these girders carrying brackets which in turn support the stonework. In the other parts of the building I-beam spandrels are used, and platforms of channels and angles are built around each column to support the masonry.

The framing of the tower from the nineteenth to the 27th floor (the bottom of the clock face) corresponds closely to the typical framing shown on the fourth floor plan. At the corners of the 25th floor platforms consisting of 15-in. channels and facia girders with 20x$\frac{3}{8}$-in. webs carry the architectural cornices. At the 27th

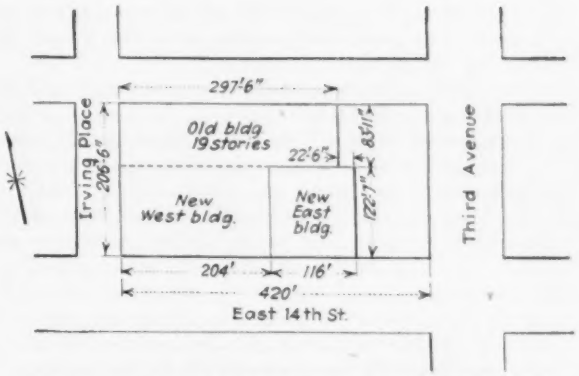


FIG. 2—PLAN ARRANGEMENT OF NEW EXTENSION TO CONSOLIDATED GAS BUILDING IN NEW YORK
Old building completed in 1913. West building completed in 1928. East building ready for occupancy. Tower occupies the southwest corner of west building.

floor the corner columns *B2*, *G2*, *B7* and *G7* are discontinued and a platform framing is substituted to carry the stone corner urns, each of which weighs 40 tons. Numerous heavy girders are used in this portion of the tower, the wall girders at the 27th floor being made up of 42x$\frac{3}{8}$-in. webs, 8x6x$\frac{3}{4}$-in. flange angles and 1½-in. cover plates. This cutback construction continues upward for three floors, or the height of the clock face; on Fig. 6 these floors are shown as stages *A*, *B* and *C*. Above stage *B* a new column arrangement is begun which reduces the tower to an octagonal shape 64 ft. in widest dimension. The column arrangement again changes at stage *D*, and from this point upward the tower is drawn into the pyramidal section at the top.

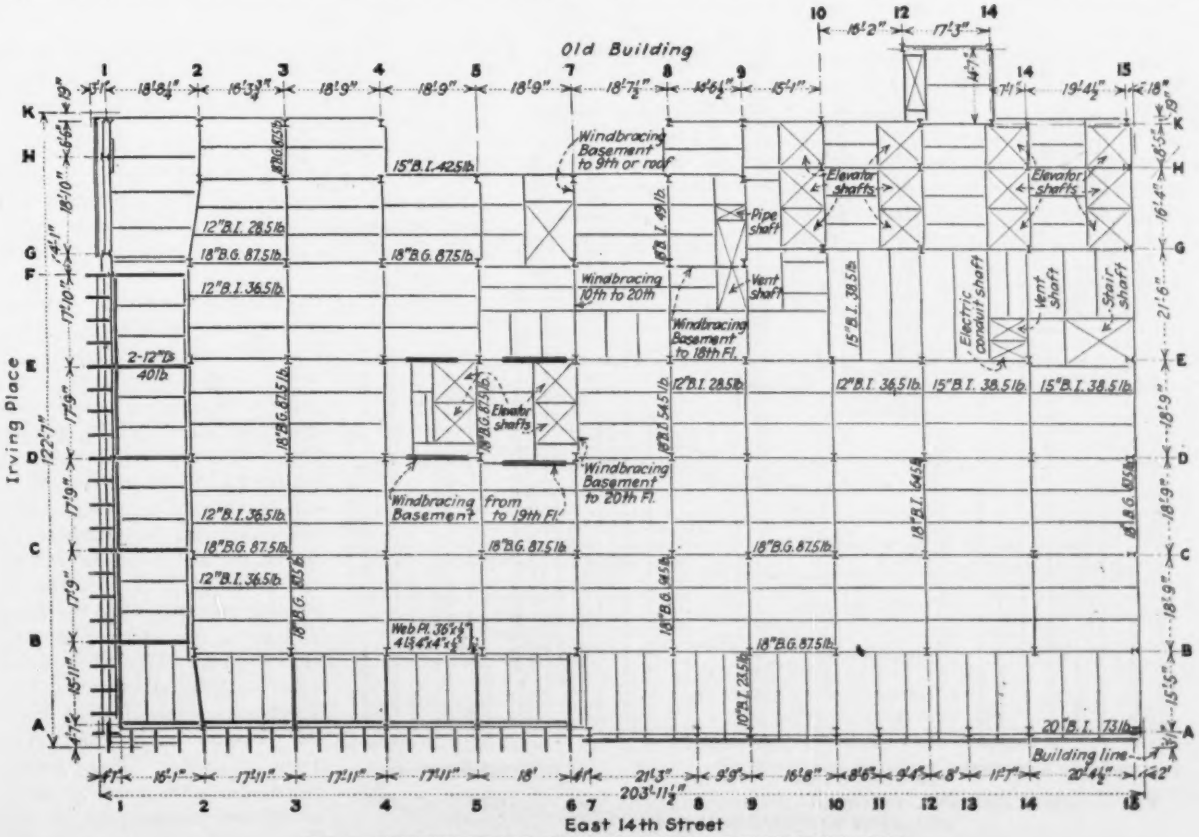
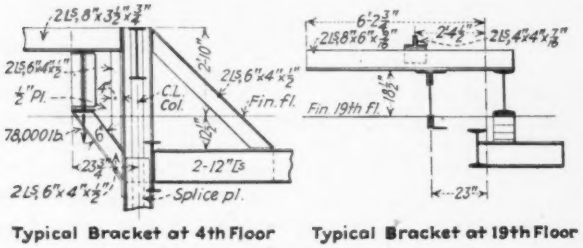


FIG. 3—FOURTH FLOOR FRAMING PLAN OF WEST BUILDING
Typical of other floors except that outside panels on East Fourteenth St. and Irving Place are discontinued above the fourth floor. The tower is outlined by column lines *B* and *G* and 2 and 7.

The framing and design considerations used in this top portion of the tower are given more in detail near the end of this article.

Tower Wind Bracing—Because of the height and unusual architectural characteristics of the tower, as well as its comparatively small plan dimensions, special attention was paid to wind stresses and the structural details for resisting them. For purposes of design, wind was assumed to act against any one of the four sides of the tower with a force equal to 30 lb. per sq.ft. over the tower face from the top down to the nineteenth floor. This resulted in an effective wind shear of 220,000 lb. on each side. No wind effect was calculated below the nineteenth floor, which was the elevation at which the tower merged with the lower part of the structure.



Typical Bracket at 4th Floor Typical Bracket at 19th Floor

FIG. 4—SPECIAL DETAILS FOR SUPPORTING STONEWORK

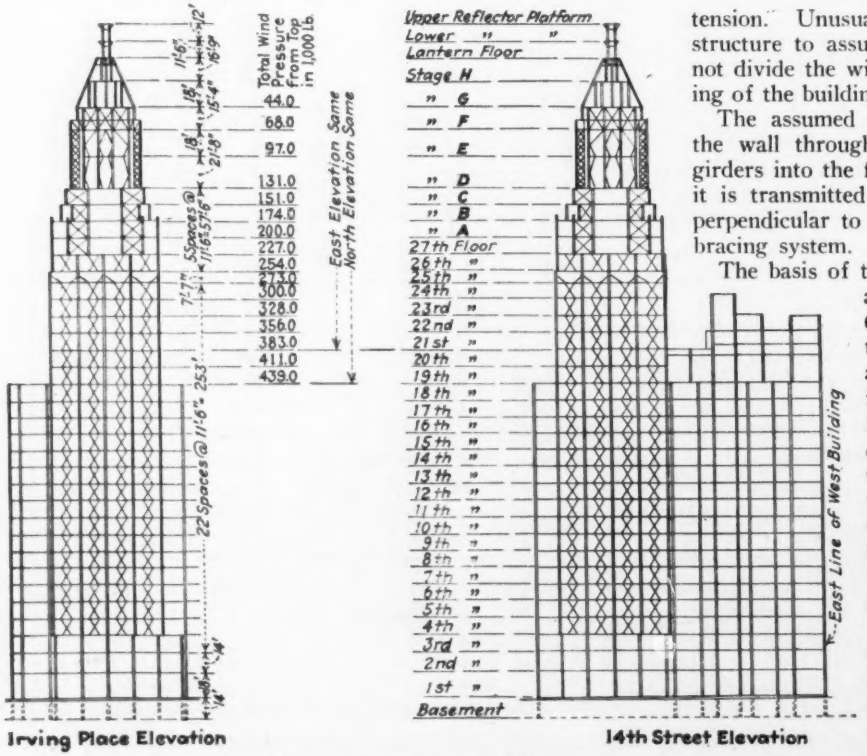
However, in this lower part of the building, outside of the tower portion, angle connections for girders in a north-south direction were made exceptionally heavy to assure rigidity. These angles were 6x4x¾ in. and used four ⅞-in. rivets in each leg for either shear or tension. Unusual rigidity was desired in the structure to assure that the steel frame would not divide the wind stresses with the stone facing of the building.

FIG. 5—TOWER PORTION OF BUILDING EMERGING FROM MAIN STRUCTURE

Tower is set back from corner for architectural appearance. Note matching of old and new stone. This is the west building. Site of new east building occupied by old brick building (Tammany Hall) at the right.

The assumed path of wind forces is from the wall through the flanges of the spandrel girders into the floor slab. From the floor slab it is transmitted as shear through the girders perpendicular to the wall and thence down the bracing system.

The basis of the wind system is an elaborate arrangement of X-bracing (Fig. 6) used in all faces of the tower, and in the Irving Place and Fourteenth St. faces extending from the fourth to the 25th floor. This type wind system of course had to be interrupted on the north and east faces below the nineteenth floor, where the tower merged with the rest of the building, and here the X-bracing was carried to the foundations in the walls of elevator shafts where these were available. Where they were not, knee-brace connections or flame-cut I-beam stub connections were utilized. These I-beam stubs also were used as beam-to-column connections in the faces of the tower to supplement the X-bracing and to pro-



Irving Place Elevation 14th Street Elevation

FIG. 6—WIND BRACING AND STRUCTURAL FRAMING OF CONSOLIDATED GAS BUILDING EXTENSION IN NEW YORK

Basis of wind system was X-bracing shown. In addition to that indicated, supplementary X-bracing was used in elevator shaft and fire tower walls. Beam-to-column connections in wind panels made by flame-cut I-beam stubs.

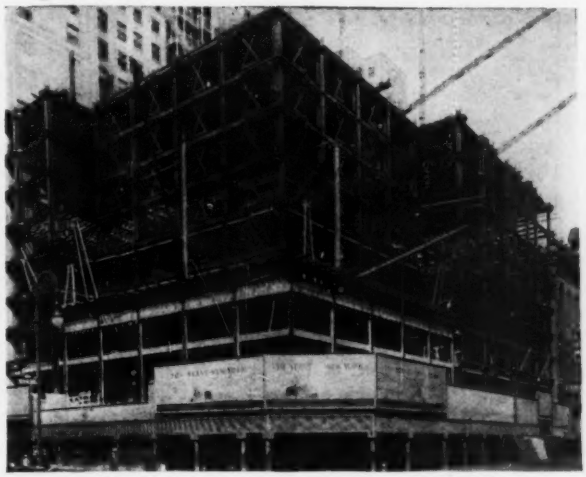


FIG. 7—ERECTING LOWER STORY FRAMEWORK OF CONSOLIDATED GAS TOWER IN NEW YORK

vide greater rigidity. In the pyramidal top of the tower, X-bracing is also the basic detail of the wind system, but because of the complications of the steelwork each panel represented a special design.

Each member of the main X-bracing consists of two 7x½-in. bars. As shown in Fig. 8, the bracing has a spread of about 6 ft., so that in a 18 ft. 9 in. panel there is nearly 6½ ft. available on either side for window openings. The spandrel girders to which the X-bracing members are attached are nominally 36 in. deep. However, the webs are in three pieces spliced at the third point of the girder and the center section is a plate 56x$\frac{9}{16}$-in., providing about 10 in. of plate above and below the spandrel flange angles for X-bracing connections. The X-bracing was installed from the inside as the frame work was assembled and was furred into the wall. The bracing members were detailed $\frac{1}{16}$ in. short for each 10 ft. of length, with a maximum reduction in length of $\frac{3}{16}$ in. and a minimum reduction of $\frac{1}{8}$ in., thus providing a means for securing additional tension.

East-West Wind System—For wind in an east-west direction, X-bracing was placed in the Fourteenth St. face of the tower from the top down to the fourth floor, in the north face from the top down to the nineteenth floor, and in three special walls below the twentieth floor. These walls are the north and south walls of the tower elevator shaft (panels *D4-D5* and *D5-D7*) and the wall of the fire tower (panel *G8-G9*) as shown in Fig. 3. The latter is outside of the tower proper, but was the only available location for the necessary X-bracing.

The distribution of wind shear and the method of carrying it from the upper part of the tower to the basement differed in the north and south elevations of the tower. In the north elevation the 220,000 lb. of wind shear could be divided equally among the four bays in the face of the tower above the twentieth floor. However, below this elevation the tower merged with the rest of the structure and a total shear of 85,000 lb. was divided 10,000 lb. to each of five panels and 35,000 lb. to panel *G8-G9* where X-bracing could be used. This X-bracing was made up of 8-in. 13.75-lb. channels from the nineteenth down to the second floor. On the first floor, however, the ceiling height was 18 ft. and the bracing was altered to that of the special A-frame bracing shown by Fig. 8.

The bracing in the north and south walls of the tower elevator shaft was K-bracing and was located in the east halves of the panels. Each bay was designed to take 55,000 lb. of wind shear. A detail of the bracing connection to the floor beams in these elevator shaft walls is shown by Fig. 8.

In the Fourteenth St. or south face of the tower the wind shear is taken in the four bays above the fourth floor, 55,000 lb. to each bay. Below the fourth floor the wind shear is taken in column lines *B* and *C* for their complete length from Irving Place to the east end of the extension, a distance of ten bays. The wind connections in this portion of the building are made up of I-beam brackets flame-cut from 24-in. 120-lb. beams.

North-South Wind System—For wind in the north-south direction X-bracing is placed in the west or Irving Place elevation from the top down to the fourth floor, and in the east elevation from the top down to the 21st floor. Below this point in the east elevation, wide X-bracing of 15-in. 33.9-lb. channels is used in the east wall of the tower elevator shaft (panel *D7-E7*)

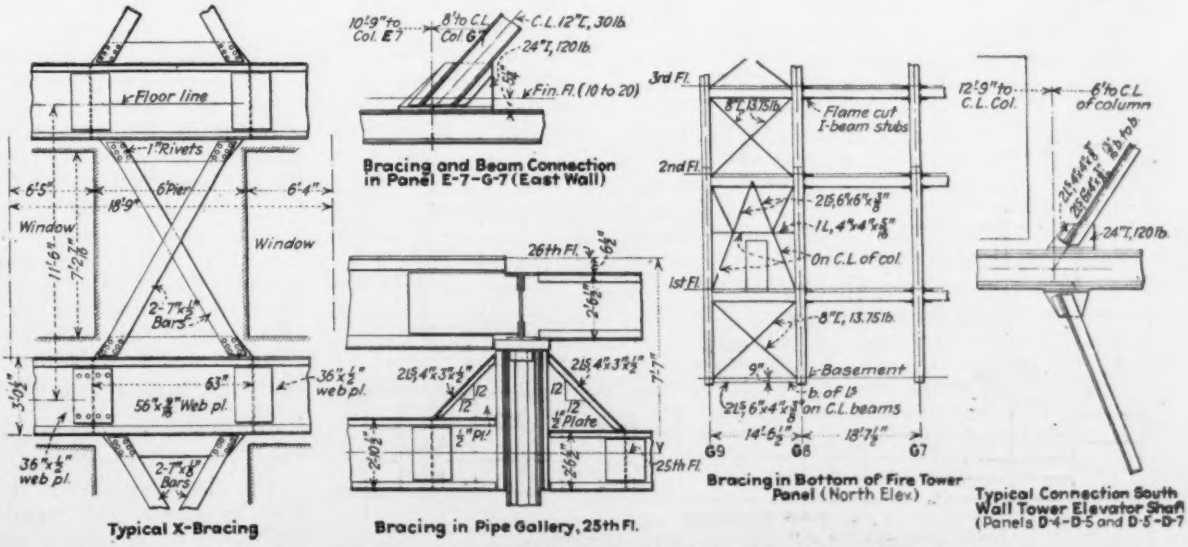


FIG. 8—TYPICAL WIND CONNECTIONS, CONSOLIDATED GAS BUILDING

from the twentieth floor to the basement, while in the north half of panel *E7-G7* X-bracing consisting of 12-in. 30-lb. channels is used from the twentieth down to the tenth floor (Fig. 8). At this point this bracing is shifted north into panel *G7-H7* (the wall of a stair shaft) in which it continues to the basement.

In the Irving Place elevation the wind distribution is in general similar to that used in the Fourteenth St. elevation—that is, above the fourth floor the total wind stresses of 220,000 lb. are taken in four bays along column line 2. Below the fourth floor, where the X-bracing is discontinued, this wind shear is taken in column lines 2, 3 and 4 through flame-cut I-beam bracket connections.

In the east elevation from the twentieth to the tenth floor the wind shear of 220,000 lb. is divided 10,000 lb. each to bays *B7-C7* and *C7-D7*, both bays utilizing I-beam stub connections, 100,000 lb. to bay *D7-E7*, which is the east wall of the elevator shaft and carries X-bracing, and the remaining 100,000 lb. to panel *E7-G7*, which carries X-bracing in one half of the panel only. On the tenth floor 90,000 lb. of this last 100,000 lb. is transferred to the outside panel *G7-H7* in which it is carried to the foundation. The remaining 10,000 lb. is carried to the foundation in panel *E7-G7*.

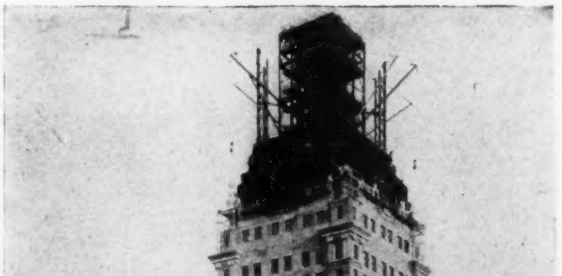


FIG. 10—TOPPING OUT THE TOWER

Derrick is placing top of one of the stone urns. Complicated steelwork in cramped quarters made it necessary to erect stone and steel simultaneously. Note lattice corner columns which carry trusses over top of stone colonnade. Note also matching of old and new stonework. New balustrade at top is stone, while balustrade connecting to it on the old building is copper covered with paint and stone dust to match.

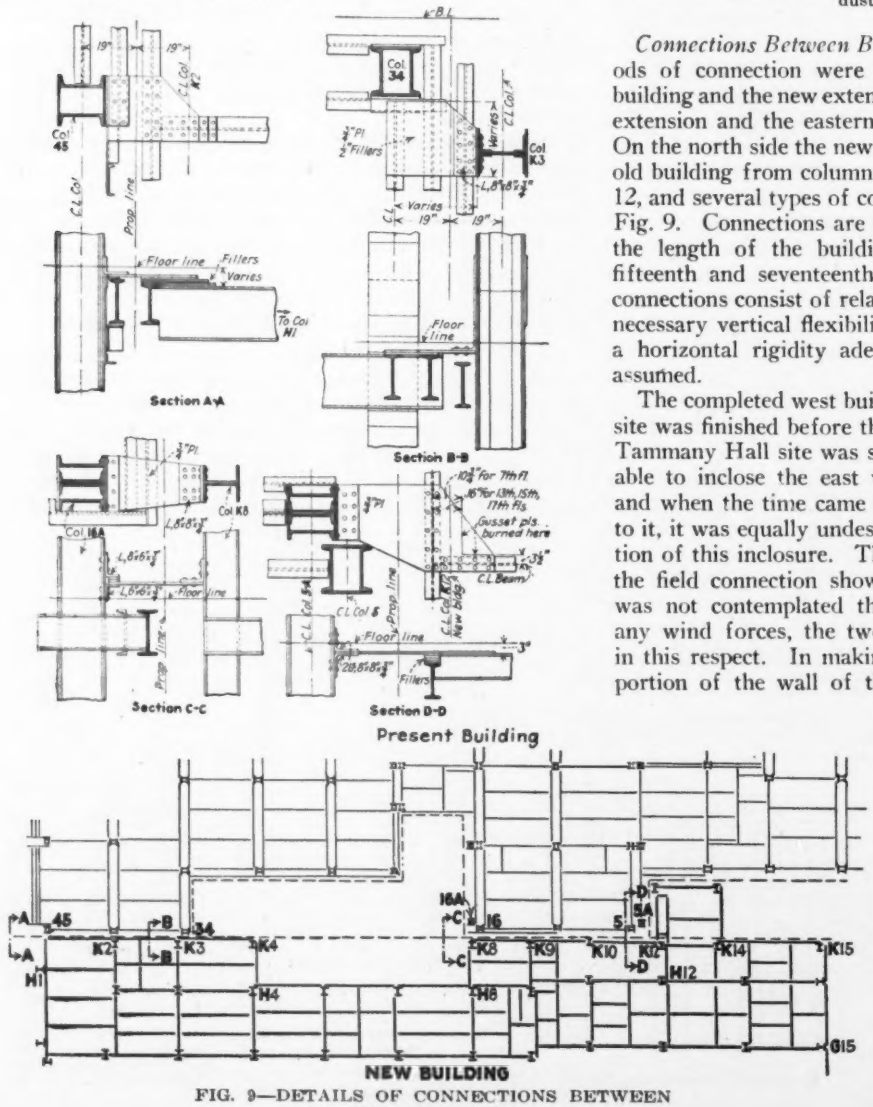


FIG. 9—DETAILS OF CONNECTIONS BETWEEN BUILDING UNITS

Connections Between Building Units—Ingenious methods of connection were utilized both between the old building and the new extension and between the completed extension and the eastern wing now under construction. On the north side the new extension is in contact with the old building from columns 1 to 4 and from columns 8 to 12, and several types of connections are used as shown by Fig. 9. Connections are made at four points only along the length of the building at the seventh, thirteenth, fifteenth and seventeenth floors. As will be noted, all connections consist of relatively long plates, providing the necessary vertical flexibility and at the same time giving a horizontal rigidity adequate for all wind connection assumed.

The completed west building on the Academy of Music site was finished before the easternmost extension on the Tammany Hall site was started. It was therefore desirable to inclose the east wall of the completed portion, and when the time came to connect the further addition to it, it was equally undesirable to remove any great portion of this inclosure. This problem was disposed of by the field connection shown by Fig. 12. Incidentally it was not contemplated that the connection should take any wind forces, the two units being entirely separate in this respect. In making the connection, only a small portion of the wall of the completed building was removed at the floor level and the new beam connection angle hung over and bolted to the existing spandrel beam. The connection detail was shop riveted, so that field work was reduced to applying four bolts, after which the wall was closed up until the whole building had been completed, when it was removed.

Special Construction Above Stage D—At stage *D*, which is the floor supporting the stone colonnade, the outside dimensions of the tower are 52x52 ft. The method of sup-

porting the stone colums and the plan layout at stage *E* are shown in Fig. 11. The corners of the tower at the colonade level inclose L-shaped lattice frames which support the ends of trusses carrying the coping above the stone columns and also the 25-ton stone obelisks on each corner. Although the stone columns may take some wind load should the upper part of the tower be distorted, care was exercised that they should carry no dead load; in order to be certain that this latter condition would be satisfied, no grout was placed between the tops of the stone columns and the stub supports of the trusses until most of the dead load was in place.

The trusses are 50 ft. long and 6 ft. deep. Each truss arrived at the job in two sections, which were riveted together in the street, and the complete truss was hoisted into place on the latticed corner columns. These corner columns were temporarily tied at their centers and tops to the tower frame by channel struts to insure their remaining perfectly plumb while the stonework was being erected.

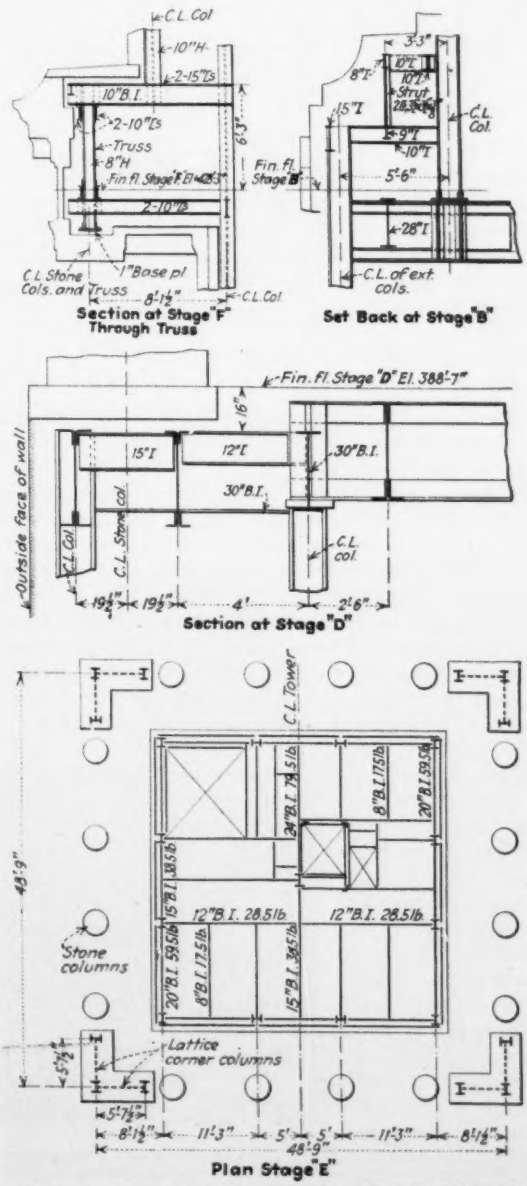


FIG. 11—STRUCTURAL DETAILS IN TOP PORTION OF TOWER

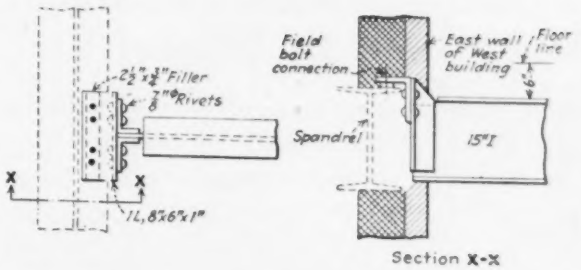


FIG. 12—DETAIL OF FIELD CONNECTION BETWEEN NEW EAST AND WEST BUILDINGS

At stage *G*, where the pyramidal sloping roof begins, heavy floor members are provided to carry a large service tank and the machinery for the elevator which runs to stage *G*. The framing for the pyramidal top consists of I-beams—sloping hip rafters of 15-in. 71½-lb. section—and horizontal purlins of varying sizes and weights which support the stonework.

Stone and steel rose from stage *G* simultaneously, a somewhat complicated procedure because of the various trades of workmen involved and because of high winds which made stonesetting impossible at times. The steel derrick was removed and both stone and steel were erected with the stone derricks. As each stone was raised it was set in place on copper flashing waterproofing, which was used between all courses; the brick backing was completed for each course of stone before the next purlin was placed and another course begun. The tower was inclosed on three sides with the derricks at stage *D*, after which these were removed, a smaller derrick was placed at the lantern floor and the fourth side filled in.

The bronze lantern had to be made up of small pieces which could be raised through the interior openings in the steelwork and erected from the inside. It was impossible to place the bracing for the lantern support until the complete lantern had been erected, and to eliminate any possibility of wind stress in the lantern the bronze plates were only loosely bolted until all of this bracing had been riveted in place.

Other Stonework—Stonework for the rest of the building, while not as difficult to erect as that in the top of the tower, nevertheless required meticulous procedure. In the first place, the rustications of the stonework on the old building had to be accurately measured and the new stone cut to match exactly. In erecting the stone, care had to be exercised that the joints of the new stone did not get out of alignment with the old. On the other hand, it was necessary that no stress be placed on the stonework as it went upward. Accordingly ½-in. open sand joints were left at the fourth and nineteenth floors, these joints closing up as the stonework was erected. As an added precaution to eliminate possibility of stress in the stonework the vertical joints between the tower and the main building and between the old and the new building were left open until all stonework was erected. Mortar joints were about ⅛ in. thick. All stone was flat bedded. Waterproofing in the form of a special paint was applied inside. Membrane waterproofing was used above the clock face at the setbacks, while, as previously stated, copper flashing was used in the pyramidal top of the tower.

The building was designed and supervised during erection by Thomas E. Murray, Inc., New York City, with Warren & Wetmore as consulting architects.

Frisco Line Builds a 293-Mile Extension to Tidewater

Large Inland Railway System Gets an Outlet on the Gulf and Rebuilds Dilapidated Short Line

BY BUILDING 151 miles of new line and rehabilitating 142 miles of an old line acquired by purchase, the St. Louis-San Francisco Railway in 1928 secured a Gulf port outlet of its own, at Pensacola, Fla., thus adding greatly to the importance of this system, which formerly reached tidewater only over connecting roads. The general character of the country traversed is shown by Fig. 1, and Fig. 2 is a map of the extension and its connections.

The purchased railway was the Muscle Shoals, Birmingham & Pensacola Railroad, an independent short

FIG. 1—ON THE PENSACOLA LINE, FRISCO RAILWAY

line built in 1911-15 from Pensacola, Fla., to Kimbrough, Ala., on the Southern Railway. From the very first the line did not pay, and after successive reorganizations it went into receivership and became in bad condition both physically and financially. But in view of the potential importance from its right-of-way and its valuable waterfront and terminal properties, the St. Louis-San Francisco Railway bought the line in 1925. At that time there was no physical connection, but the former road had a 12-mile branch from Amory, on its Memphis and Birmingham main line, to Aberdeen, Miss. An extension from Aberdeen southeast to Kimbrough was then built, thus completing a through route to the Gulf.

Rehabilitation of Old Line—Improvement work necessary to put the old M.S., B. & P. R.R. in condition for service included thorough revision for the entire length and practical reconstruction on about 50 miles, which had numerous and sharp curves and a broken profile with grades as steep as 3 to 4 per cent. For long stretches of line the roadbed width on cuts and fills was barely enough to accommodate the ties. Track conditions were of the poorest, with battered rails of 50- to 75-lb. weight, joints held by two or three bolts and ties so defective that for many miles every tie had to be replaced. Bridge ties and decks were in similar condition. The only ballast was the roadbed material.

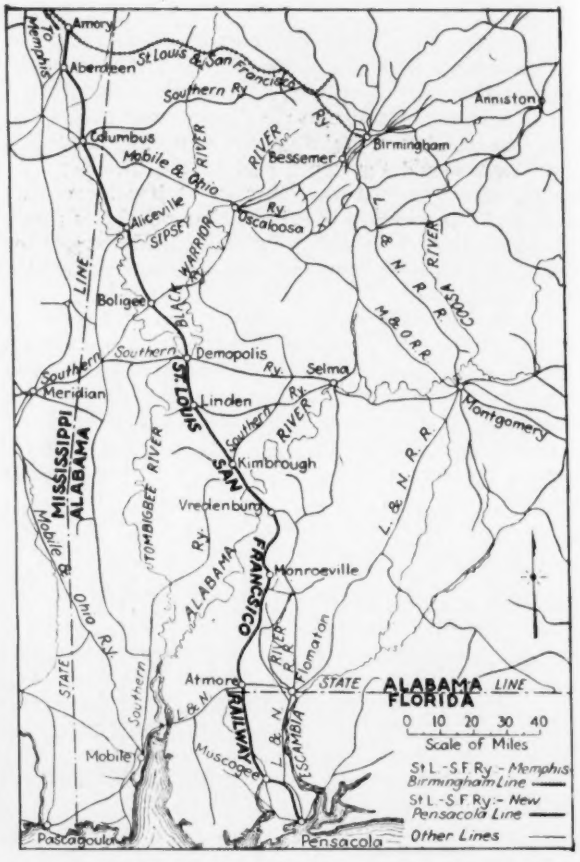


FIG. 2—PENSACOLA EXTENSION OF ST. L.-S. F. RY.

Trestles were in bad repair, and in several cases the original bents had been supplemented by two-pile bents at mid-span. Some of the shorter trestles were filled, box or pipe culverts taking care of the waterways. All the others were rebuilt entirely, but before this could be done it was necessary to strengthen the decks with additional stringers in order to support the railway piledriver. After the piles had been driven by railway forces, the placing of the caps, stringers and decks was done by contract. Track was also laid by contractors' forces. Owing to the grade revision, the decks of some of the old trestles had to be raised as much as 4 to 10 ft. by blocking, in advance of the piledriver.

As the first step, a complete survey of the existing line was made, plans and profiles being then prepared so that the necessary revision of grade and alignment could be planned. Owing to the dilapidated condition of the line, it was necessary to renew the trestles and ties and to repair the track in advance of the grading, using earth ballast to put the track in safe condition to

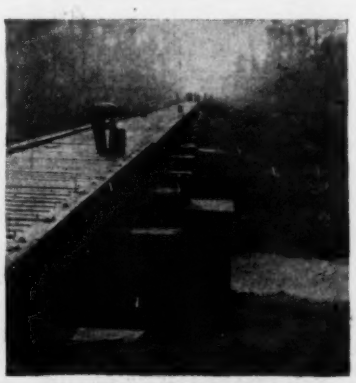


FIG. 3—LONG TRESTLE CONSTRUCTION
The concrete piers are for a girder span placed later.

FIG. 4—TRACKLAYING TRAIN

carry the work trains before the regular gravel ballast was placed. All the grading, ballasting, tie and rail renewals and track repairs was done by contract.

Grade revision consisted largely in smoothing out an irregular profile with longer and easier grades. Curve revision was less extensive, except on the 50-mile stretch noted above, but relocation combined with grade reduction was required on a length of about 6 miles. The only steel bridge was that over the Alabama River, which had two truss spans of 144 ft. flanking a gasoline-operated swing span 290 ft. long. This structure was in fairly good condition.

The New Line—For the 151-mile extension from Aberdeen to Kimbrough, the location was mainly through rolling country and was limited to grades of 0.5 per cent and curves of 4 deg. In general the grading consisted of light cuts and long fills 20 to 40 ft. high, more than 50 per cent of the fill material being taken from borrowpits. Some of the higher fills were built by dumping from cars on light trestles. A large proportion of this fill material was wet and soft, so that the allowance for vertical settlement due to shrinkage was 25 per cent when placed by dumping from dragline buckets, 12 per cent when dumped from cars on trestles, and 10 per cent when placed by scraper and teams.

Pile trestles constitute the greater part of the bridging, but there are two through-truss bridges and several steel girder spans, most of them with long trestle approaches. To facilitate the filling and also to expedite the opening of the line, both the construction and the permanent trestles were built continuous over the sites for steel spans, as shown by Fig. 3. The most important bridge is the 184-ft. vertical lift span over the Black Warrior River (*Engineering News-Record*, March 14, 1929, p. 430); this is flanked by two 100-ft. truss spans which carry the towers. Grading, bridge work, ballasting and tracklaying on this new line was all done by contract. The track is laid with 90-lb. relayer rails, which were used also on the existing line from Amory to Aberdeen and on the rehabilitated line from Kimbrough to Pensacola. Figs. 4 and 5 show the tracklaying.

FIG. 5—LAYING RAILS WITH LOCOMOTIVE CRANE

Freight and Coaling Piers—Rail-and-water terminal facilities at Pensacola include a freight pier 1,200 ft. long and 130 ft. wide, with warehouse or dock shed; an open pier 906x21 ft. for shipping lumber; and a coal-shipping pier 520x46 ft. The freight and coaling piers are shown in Fig. 6 and the terminal layout in Fig. 7. There is about 32 ft. of water in the slips, 160 and 185 ft. wide, between the piers. All these structures, of timber construction, had been damaged by neglect and hurricanes, while the piling had been attacked ex-

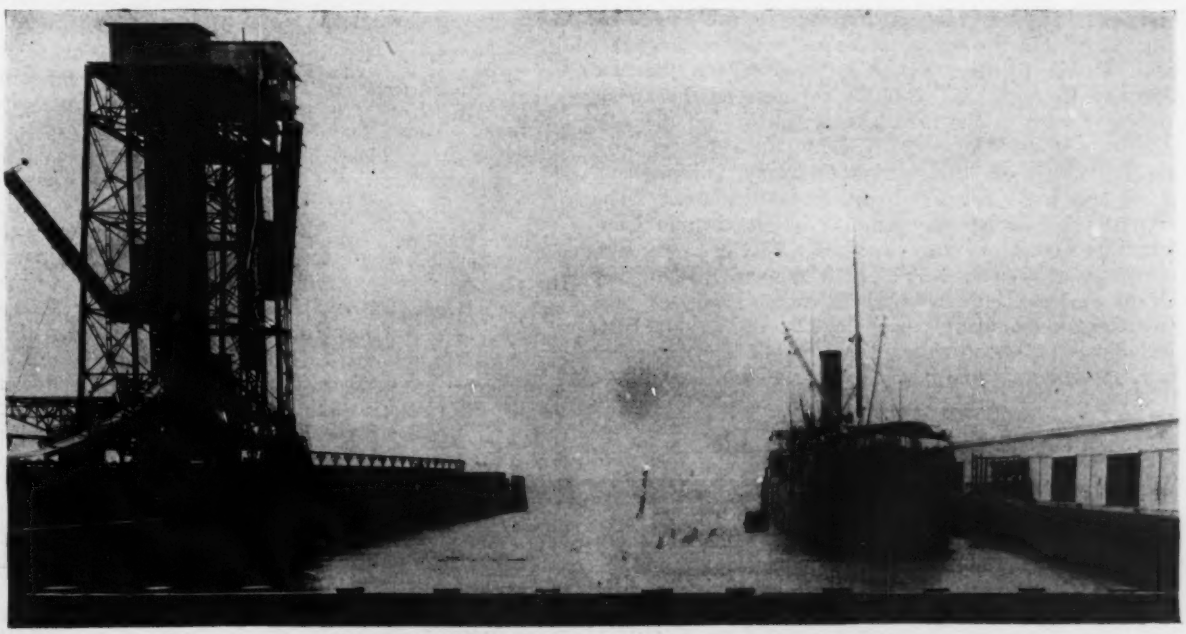


FIG. 6—FREIGHT PIER AND COALING PIER AT PENSACOLA
Conveyor belt at left delivers coal to bucket elevator in spouting tower that travels along the pier.

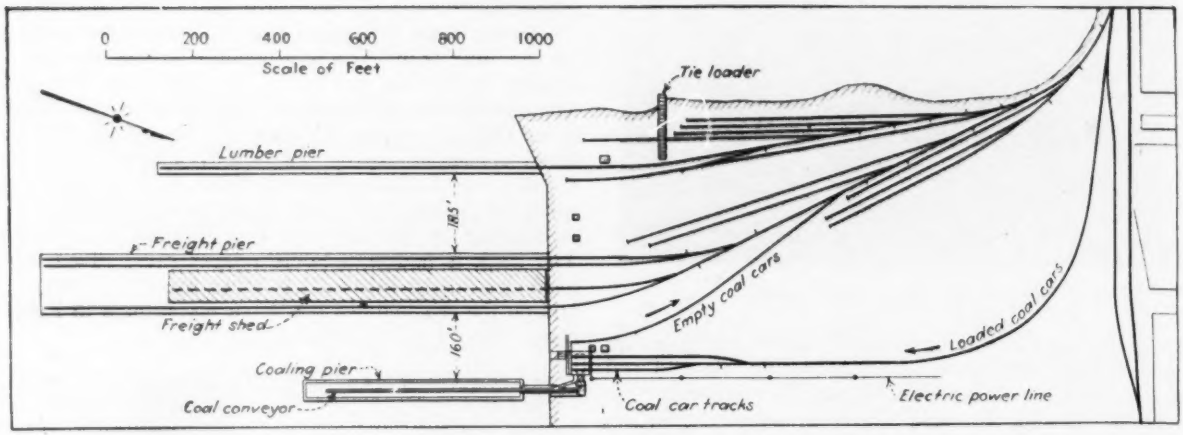


FIG. 7—PENSACOLA WATERFRONT TERMINAL, ST. L.-S. F. RY.

tensively by boring worms. Much repair and rebuilding was necessary, and all new and old piles were protected by concrete casing placed by means of cylindrical wood forms. At Pensacola also is the principal engine terminal and a freight yard, both of which were enlarged and rebuilt. New coaling plants and water stations had to be constructed along the whole route.

The coaling pier (Figs. 6 and 7) is equipped with a belt conveyor and a traveling steel tower from which coal is spouted into the vessels. Cars on three stub-tracks parallel with the pier dump coal into a track hopper and are then shifted by a transfer table to the outgoing or empty-car track. An inclined bucket conveyor takes the coal from the hopper and feeds it to the conveyor belt, which runs along the dock floor. At the tower, the coal is discharged into the boot of a vertical bucket elevator, which delivers it to the inclined spouts on both sides of the tower. This plant, electrically operated, can handle 600 tons per hour.

Engineers and Contractors—All this work of construction and reconstruction was planned and executed under the direction of F. G. Jonah, chief engineer of the St. Louis-San Francisco Railway. It was in general charge of H. B. Barry, principal assistant engineer, with T. W. Kinsley as resident engineer on the new line and R. B. McKee resident engineer on the reconstruction work. The principal contractors on the new line were Ross, Wogan & Company, Kansas City, Mo.; the C. G. Kersaw Contracting Company, Birmingham, Ala.; and J. A. Kreis & Sons, Knoxville, Tenn. The reconstruction work was handled by the Duplin Construction Company, Warsaw, N. C.; Reid & Lowe, Birmingham, Ala.; and R. F. Carr, Memphis, Tenn., but all the concrete culverts were built by the Hedges-Weeks Construction Company, Springfield, Mo. The total cost, including new construction, rehabilitation and improvements to buildings and terminals, was about $12,000,000.

American Cities Have 4,778 Buildings Ten or More Stories High

American cities have 4,778 structures ten or more stories in height; 42 of the 173 cities of 50,000 or more population have no buildings of that height, and 59 cities report less than five each, according to a survey made by the Thompson-Starrett Company, Inc., of New York. Six cities report more than 100 buildings ten or more stories high, these being New York with 2,479, Chicago with 449, Los Angeles with 135, Detroit with 121, Philadelphia with 120 and Boston with 104. Philadelphia has 22 buildings 21 or more stories high, Chicago has 65 and New York has 188 such structures.

There are ten buildings more than 500 ft. tall, and five others are being built, the report says. The highest is the Woolworth Building, rising 792 ft., which was constructed sixteen years ago. Two other New York skyscrapers now under way will reach higher than this, the Chrysler Building, rising to a height of 808 ft. and the Bank of Manhattan Building, which will be 836 ft. above the sidewalk.

Joint Sewage-Works Planned for the Twin Cities

SEWAGE treatment for the cities of St. Paul and Minneapolis as a single district is recommended by the Metropolitan Drainage Commission in its second annual report. At present, South St. Paul and Newport should not be included in this district, but they should be permitted to contract with it for the treatment of their sewage and the packing-plant and stockyard wastes. A single sewage treatment and disposal plant in the Pig's Eye Lake section is recommended, if equitable adjustment of the cost of the intercepting sewers can be made. These interceptors would practically parallel the river from above Minneapolis to below St. Paul. The proposed location of the works is in the southeast section of St. Paul, on the east side of the Mississippi.

In order to insure equitable tax rates in the two cities during the period of construction, it is suggested that the permanent commission should adopt a plan to provide ultimately for complete treatment of the sewage, the estimated cost being then apportioned between these cities. Since delay will mean higher annual costs in the future, with no ultimate saving, the commission recommends that construction should be begun as soon as possible. The cost is estimated at $25,060,000, of which $9,540,000 is for intercepting sewers and pumping stations and $15,520,000 for the sewage-works.

With the construction of dams across the river and the increasing industrial development, the pollution of the river has reached an unsanitary condition. The report includes a study of the river pollution and a comparison of several projects for the sewage-works. J. A. Childs is chief engineer for the commission, which was created by the state legislature in 1927.

Economical Proportions of Storage Tanks

An Analysis of the Related Factors of Surface Weight and Costs When Considered for Any Given Volume

By Robins Fleming
American Bridge Company, New York City

SINCE the necessary volume of storage invariably is fixed by requirements, the designer of tanks is confronted with the problem of providing this storage using a minimum of material. This article considers, in order, the questions of minimum surface, minimum weight and minimum cost of steel tanks for any given volume, presenting the equations for diameter and height in terms of this volume for tanks of various types. A table of notation is given, but the mathematical derivations of the equation are not considered necessary. Briefly, the procedure of derivation consists in determining the differential of the surface area (or of the weight) with respect to the diameter and equating this differential to zero, thus securing a value for the diameter in terms of the volume. The height can then be expressed in terms of the volume and the diameter.

The yearly output of steel storage tanks is enormous. In the Jan. 5, 1928, issue of *Iron Age* there are assigned to the oil, gas and water companies 202.8 thousand gross tons of plates, 27.4 thousand tons of structural shapes and 47.4 thousand tons of bars. For 1928 the figures are 125.6 thousand gross tons of plates; 31.5 thousand tons of structural shapes and 35.8 thousand tons of bars.

According to a survey made by the U. S. Bureau of Mines, the grand total of tankage May 1, 1926, exclusive of producers' storage at the wells, amounted to more than 800,000,000 bbl. of 42 U. S. gallons. This storage is made up of steel, wooden, earthen and concrete vessels, but steel storage comprises 80 per cent of the total. The remainder is about evenly divided between earthen and concrete storage, with wooden storage almost negligible. A 55,000-bbl. oil tank of reinforced concrete built in 1918 for the Panama Canal is described in *Engineering News-Record*, Feb. 19, 1920, p. 380.

Minimum Surface for a Given Volume

Problems relating to the economical ratio of diameter to height of cylindrical vessels are given in the maxima and minima section of many textbooks on the calculus. The reader is assumed to be familiar with the simple principles upon which such problems are based.

Considerations other than the minimum amount of surface usually enter into the proportioning of tanks, standpipes and gasholders. The ordinary tin can is an example of any of these vessels, and in making tin cans the top and bottom are cut from sheets of tin using a regular hexagon each time, the waste being a total loss. If that waste is considered, the height is $\frac{2\sqrt{3}}{\pi} = 1.102d$. However, in the following equations for determining minimum surface, waste is not considered.

For a tank with cover, cylindrical shell and base:

$$d = 1.08\sqrt[3]{V}$$

$$h = 1.273\left(\frac{V}{d^2}\right) = 1.08\sqrt[3]{V} = d$$

For a tank with shell and base but no cover:

$$d = 1.37\sqrt[3]{V}$$

$$h = 1.273\left(\frac{V}{d^2}\right) = 0.685\sqrt[3]{V} = \frac{d}{2}$$

For a tank with a cover, shell and hemispherical bottom:

$$d = 1.15\sqrt[3]{V}$$

$$h = 0.58\sqrt[3]{V} = \frac{d}{2}$$

For a tank with shell and hemispherical bottom but no cover:

$$d = 1.56\sqrt[3]{V}$$

$$h = 0\sqrt[3]{V} = 0d \text{ or } h = 0.$$

Minimum Weight of Plate for a Given Volume

If the plates of a tank were the same thickness throughout, the ratio of height to diameter to secure the minimum weight of plate for a given volume would be the same as for surface area; but this ideal condition seldom exists. The problem, however, is easily solved by introducing proper coefficients in the previous equations. Four oil storage tanks with plate thicknesses in accordance with the American Petroleum Institute Specifications for Standard Tanks With Riveted Shells will be considered. Previous notation will be followed with the thicknesses of plate introduced as coefficients.

For a tank with $\frac{3}{16}$-in. cover, $\frac{1}{4}$-in. shell (average thickness) and a $\frac{1}{4}$-in. base:

$$d = 1.13\sqrt[3]{V}$$

$$h = 1\sqrt[3]{V} = 0.88d$$

For a tank with a $\frac{3}{16}$-in. cover, $\frac{5}{16}$-in. shell (average) and $\frac{1}{4}$-in. base:

$$d = 1.22\sqrt[3]{V}$$

$$h = 0.86\sqrt[3]{V} = 0.7d$$

For a tank with a $\frac{3}{16}$-in. cover, $\frac{7}{16}$-in. shell (average) and a $\frac{1}{4}$-in. base:

$$d = 1.36\sqrt[3]{V}$$

$$h = 0.69\sqrt[3]{V} = 0.51d$$

For a tank with a $\frac{3}{16}$-in. cover, $\frac{1}{2}\frac{7}{2}$-in. shell (average) and a $\frac{1}{4}$-in. base:

$$d = 1.46\sqrt[3]{V}$$

$$h = 0.6\sqrt[3]{V} = 0.41d$$

For a tank for water storage resting on an I-beam platform, with $\frac{3}{16}$-in. cover, $\frac{5}{16}$-in.shell and $\frac{1}{2}$-in. base:

$$d = 1.05\sqrt[3]{V}$$

$$h = 1.15\sqrt[3]{V} = 1.1d$$

NOTATION TABLE

d = diameter of tank
h = height of cylindrical shell
V = volume of tank with flat base $= \frac{\pi d^2 h}{4}$ or $h = \frac{4V}{\pi d^2} = 1.273\frac{V}{d^2}$

Surface of base $= \frac{\pi d^2}{4}$

Surface of cylindrical shell $= \pi dh = \frac{4V}{d}$

Surface of cover $= \frac{\pi d^2}{4}$

Volume of hemisphere $= \frac{2}{3}\pi r^3 = 0.262d^3$

Surface of hemisphere $= 2\pi r^2 = 1.571d^2$

Volume of tank with hemispherical bottom. $= \frac{\pi d^2}{4}h + 0.262d^3$ or $h = 4\left(\frac{V - 0.262d^3}{\pi d^2}\right)$

For the same tank as above without the cover:

$$d = 1.17 \sqrt[3]{V}$$
$$h = 0.93 \sqrt[3]{V} = 0.8d$$

For a tank for water storage with $\frac{1}{8}$-in. cover, $\frac{1}{4}$-in. shell and $\frac{3}{8}$-in. hemispherical bottom:

$$d = 1.05 \sqrt[3]{V}$$
$$h = 0.8 \sqrt[3]{V} = 0.76d$$

For the same hemispherical bottom tank as above but without a cover:

$$d = 1.15 \sqrt[3]{V}$$
$$h = 0.59 \sqrt[3]{V} = 0.52d$$

Minimum Cost for a Given Volume

Tanks for the storage of oil only will be considered. George T. Horton, president, Chicago Bridge & Iron Works, in a study of plate sizes and tank capacities says that the most economical tank is almost 50 ft. high for all capacities, the desired capacity being secured by varying the diameter. "A 55,000-bbl. tank 114 ft. in diameter and 30 ft. high, an almost universal size, is a most unfortunate proposition," according to Mr. Horton. "If made either 90 ft. in diameter and 48 ft. high or 102 ft. in diameter and 42 ft. high, a saving of 2c. per barrel would result; 80,000-bbl. tanks, of the size generally built, are much nearer the point of minimum cost." Mr. Horton later laid down as a theorem: "The cost per barrel of storage decreases as the size of tank increases up to a certain limiting size of definite diameter and height." The limiting tank, under the American Petroleum Institute specifications, he says, would have a diameter of 276 ft., a height of 45 ft. and a capacity of 475,000 bbl. if the tank were built in west Texas at the time he wrote.

The factors entering into the cost of tank construction are many and complicated. The cost of material varies. If the roof is made of $\frac{3}{16}$-in. copper bearing steel there is an addition of $4 per ton to the base price on account of the thickness and an addition of about $3 per ton for the copper content, altogether an addition of 20 per cent to the base price at Pittsburgh. The support for the roof, the framing of which varies theoretically as the cross-sectional area of the tank, and the columns, varying theoretically as the height, are also to be considered. Finally, the cost of fabrication of tank items varies widely.

The writer, with access to several hundred estimates of tanks, hoped that by introducing proper coefficients into the foregoing equations he would arrive at a theoretical determination of minimum cost. For instance, the roof would include the roof framing and column supports. With the additional cost of the $\frac{3}{16}$-in. plate and of fabrication, a coefficient of about $\frac{3}{8}$ would be used. The average thickness of shell would be assumed from previous estimates. The thickness of the bottom plate is usually $\frac{1}{4}$ in., depending upon soil conditions. In the midst of his work on this question, there appeared an article by H. C. Boardman in the October, 1928, issue of *The Water Tower*, the trade paper of the Chicago Bridge & Iron Works, which was so comprehensive and thorough that it appeared useless for the writer to continue his work.

Because of the assumptions made, the chief value of Mr. Boardman's equations is, as he says, to indicate trends and effects of various factors on economic proportions, rather than to give correct quantitative results. "The proper proportions," according to Mr. Boardman, "for a tank of a given capacity should be determined by carefully designing a series of tanks of that capacity having different heights and diameters and then figuring their weight and costs." It is shown that the best height for a given diameter is not necessarily the best height for the capacity given by that height and diameter. For example, a tank about 47 ft. high and 110 ft. in diameter having a capacity of 80,000 bbl. might be the very best tank that could be built with a diameter of 110 ft., but an 80,000-bbl. tank 117 ft. in diameter and about 42 ft. high would be cheaper.

The closing paragraph of Mr. Boardman's article reads: "In the light of this investigation it seems probable that the most economical tank is at least as large as can be made with present methods and equipment; and that the limit will be fixed by considerations other than mere cost of steel per barrel of storage." The last sentence is significant. For instance, fire, lightning and explosion risks must be taken into account. The risk from these factors is greater for one 110,000-bbl. tank than for two isolated tanks of 55,000 bbl. each. Soil conditions may determine the limit of height. The cost of land, especially for marketing stations within or near city limits, may determine the diameter. Occasionally local conditions other than those mentioned may be the determining factor.

The largest steel tanks yet built, within the writer's knowledge, are two tanks at the Portsmouth Navy Yard with a capacity of 150,000 bbl. each. The catalogs of a number of tank manufacturers list an 80,000-bbl. tank as their largest stock size, although "larger tanks can be erected with little delay." The American Petroleum Institute specifications confine their standard sizes to seven standard diameters with heights varying in each case up to 46 ft. The largest tank in this tabulation has a capacity of 134,000 bbl., a diameter of 144 ft. and a height of 46 ft.

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390 Grade Crossings Eliminated From Federal Highways in 1928

A total of 390 railroad grade crossings was eliminated from the federal-aid highway system in 1928, says the U. S. Bureau of Public Roads. Grade crossings are eliminated in two ways—by grade separation by means of the underpass or overpass and by relocation of highways. Of the 390 crossings eliminated in 1928, 107 were grade separations and 283 were excluded by relocation of highways. According to figures of the bureau, covering the period 1917 to Dec. 31, 1928, a total of 4,291 crossings has been eliminated on the federal-aid system with federal aid—947 through grade separations and 3,344 through relocation of highways. For the year 1928, Wisconsin heads the list of eliminations, with a total of 35. Alabama is second with 31, Michigan third with 26, Texas fourth with 25, Indiana fifth with 24, Kansas sixth with 23, and Montana seventh with 22. Georgia and Illinois each are credited with 21, and Mississippi with 17. For the period from 1917 through 1928, Texas heads the list with a total of 440 eliminations. Minnesota is second with 321, Iowa third with 212, Wisconsin fourth with 204, North Dakota fifth with 193, Georgia sixth with 182, Oklahoma seventh with 162, Illinois eighth with 161, Kansas ninth with 153, and North Carolina tenth with 132.

Lining Keeps Up With Driving on Water Tunnel

Special Form Jumbo on Pigeon River 14-Ft. Bore Permits Muck Trains to Pass—Headings Average 450 Ft. Per Month—Tunnel Over 6 Miles Long and Has 552-Ft. Vertical Drop

FIG. 1—TRANSITION FROM 14-FT. CIRCLE TO THREE 8-FT. PENSTOCKS IN 6.2-MILE TUNNEL; WATERVILLE HYDRO-ELECTRIC DEVELOPMENT

DRIVING and lining simultaneously a 14-ft. horseshoe section tunnel 6.2 miles long on the Waterville hydro-electric development in North Carolina was necessary because of a 2½-year time limit set for completing the bore. The tunnel is being built as part of a 100,000-kw. power project under construction at Waterville, N. C., which will operate under a static head of 861 ft. The development as a whole, including the design and construction of an arch dam 200 ft. high, was described in *Engineering News-Record*, June 6, 1929, p. 894. Two shafts, 662 and 639 ft. deep, were sunk on the tunnel line, one to be used as a surge shaft, the other providing a 552-ft. vertical drop for the tunnel. A map and profile of the tunnel are shown in Figs. 2 and 3. At Mount Sterling Creek the tunnel strikes a short open gap, which provided two additional headings for driving.

As can be seen from Fig. 2, the intake of the pressure tunnel is located on Cataloochee Creek, though the dam is on Pigeon River. A concrete and steel gate structure rising 120 ft. above the intake portal will carry a 16-ft. sliding steel gate controlling the intake flow. From the bell mouth intake the tunnel section is a 14-ft. circle for 150 ft., then changes to the horseshoe section shown in Fig. 4. From the intake to Mount Sterling Creek, 3.1 miles, the tunnel is being driven from the two portals only, being the longest stretch without a shaft. For the 307 ft. across Mount Sterling Creek gap the water will be carried in a 14-ft. steel pipe. All transitions from circular to horseshoe sections take place in a linear distance of 20 ft. The tunnel and shafts are lined throughout with a minimum of 4 in. of concrete in the tunnel and 1 ft. in the shaft. At a point 800 ft. from the outlet portal the tunnel changes from horseshoe to circular for 199 ft., then branches out into three parallel tunnels on 54-ft. centers carrying 8-ft. steel pipes, each leading to a unit in the power house (Fig. 1).

About a mile below Mount Sterling Creek a shaft known as Gap shaft was sunk 662 ft. deep, through which the tunnel drops 556 ft. to the lower level. The shaft is circular, 16-ft. diam. inside of rock with a 1-ft. lining. The transition between the tunnel at two levels and the shaft is shown in Fig. 9. After the shaft was sunk headings were started both ways on the tunnel line.

About 1,700 ft. from the outlet portal a shaft 639 ft. deep was sunk to act as a surge chamber. This shaft is 18 ft. in diameter inside of rock with a 1-ft. lining. The upper 112 ft. is lined with a 16-ft. steel pipe. Surmounting the top of the shaft is a 42-ft. diameter steel surge tank 195 ft. high.

Access to Tunnel Points—A 3-ft. gage logging rail-

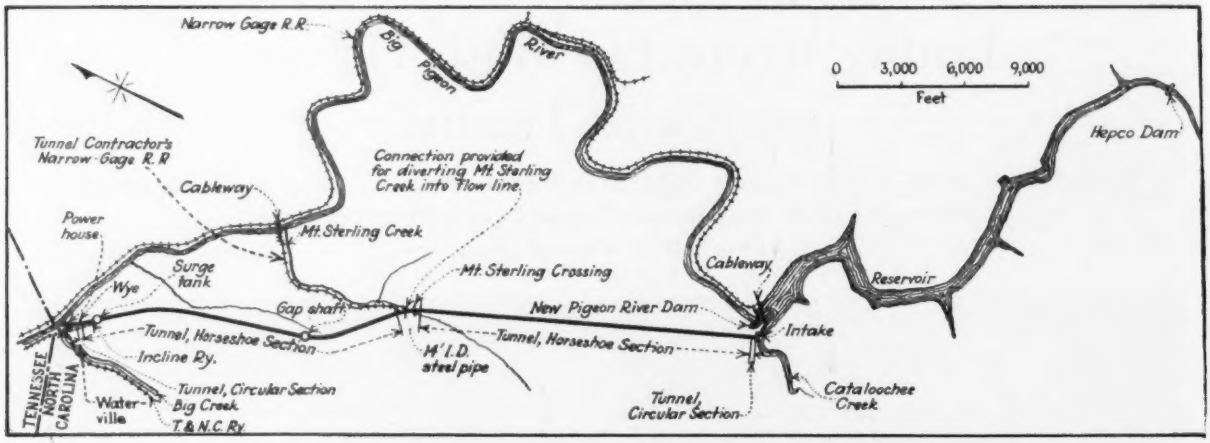


FIG. 2—MAP OF WATERVILLE HYDRO-ELECTRIC DEVELOPMENT

road running part way up the canyon from Waterville along the east bank of Pigeon River was extended to the dam. At the dam and at the Mount Sterling Creek junction with the river, a 1,700-ft. hoist cableway of 10-ton capacity was built crossing the river. From the Mount Sterling cableway a narrow-gage road 1½ miles long was built to provide access to the tunnel at the creek crossing. The cableway at the dam fulfilled a twofold purpose: getting supplies, machinery and materials from the narrow gage to the intake portal, and transporting the tunnel muck across the river to the dam concrete plant, where it was crushed and used for aggregate. At the outlet portal a cable-operated incline railroad (Fig. 5) provides access to the top of the surge shaft and also to the Gap shaft by a road along the ridge between the two shafts.

Tunnel Driving—Headings were started from six points, one at the intake, two at Mount Sterling, two at Gap shaft and one at the outlet. The heading and bench method of driving was used on all headings, keeping the bench about 8 ft. long. Steel up to 13 ft. long was used, pulled from 7 to 9 ft. per shot. The headings and bench were drilled and shot together. A drilling diagram is shown in Fig. 8, 26 holes being drilled in the heading and six in the bench, shot with first and second delays as indicated. Drifter drills mounted on columns were used in both headings and benches, all holes being drilled horizontally.

All muck was loaded by electric mucking machines, Current is brought into the headings at 2,300 volts, stepped down to 220 volts by transformers kept about 1,000 ft. from the working faces. Much current loss was eliminated by this procedure, according to the contractor. Muck trains were handled by storage battery locomotives and gasoline dinkeys. Ventilation is supplied by an 8-in. steel pipe, making the use of gas dinkeys possible with little or no air contamination. Air-driven pumps keep the headings dry where they cannot be drained.

Two shifts per day were used, with a complete cycle of drilling, shooting and mucking out each shift. The

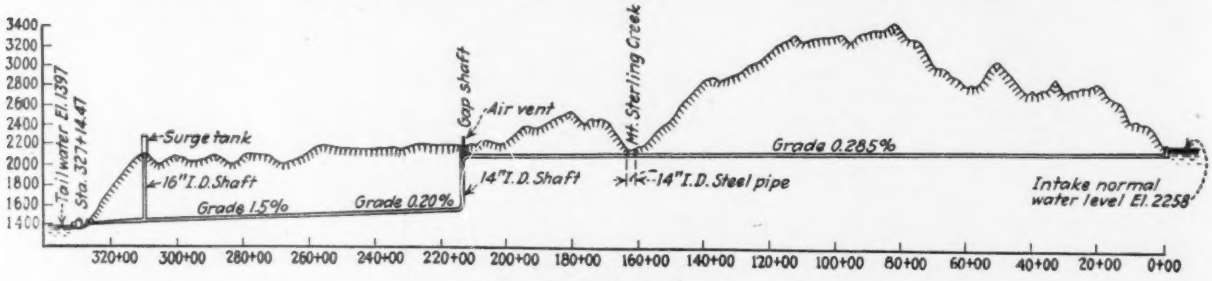


FIG. 3—PROFILE OF TUNNEL

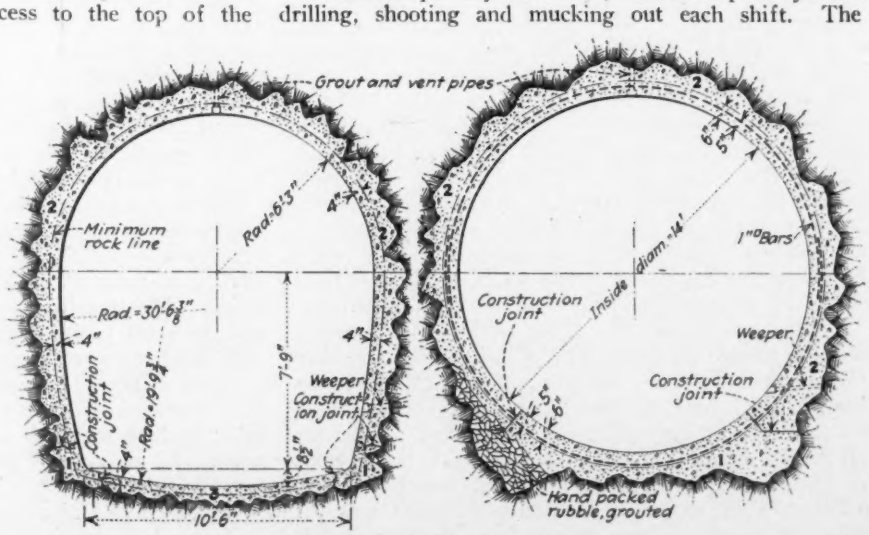


FIG. 4—TUNNEL SECTIONS

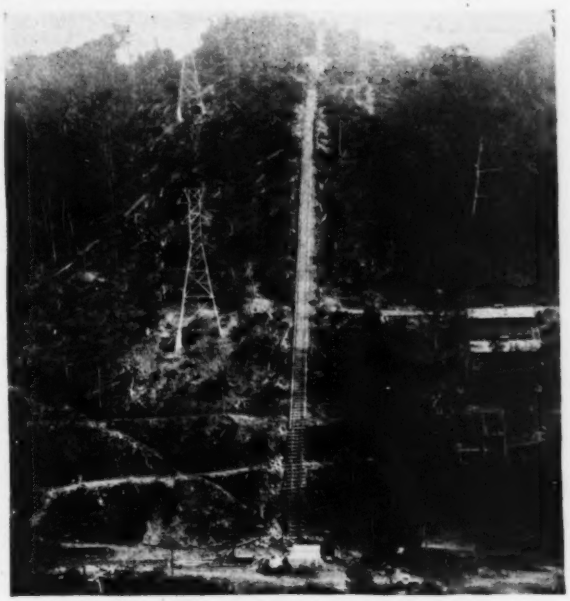


FIG. 5—CABLE-OPERATED INCLINE RAILWAY TO TOP OF SURGE TANK SHAFT

headings averaged about 460 ft. per month. Trimming crews followed up with jackhammers, knocking out the tight places and drilling holes for dowels supporting the pipe lines and electric cables.

Shaft Sinking—Practically the same procedure was used in sinking both shafts. A drilling and shooting diagram of the Gap shaft is shown in Fig. 7. Derricks started the sinking operations, replaced with head frames as soon as the depth assured safety from shooting. At Gap shaft muck from the upper and lower tunnel levels was taken out through the shaft in cars hoisted by slings and steadied by a cross-beam running on two cable guides.

Timbering—Very little timbering was required for the entire tunnel. At the outlet soft ground was encountered for the first 75 ft., requiring timber bracing in all three penstocks for that distance. Timbering was required in the Gap shaft from the surface down to the upper tunnel level and for a short distance in the upper tunnel from this shaft.

Concrete—Crushed tunnel muck is used for all concrete aggregate. As no sand is available, finely crushed rock is used. Concrete proportions are 1:2:4 for the intake structure and shaft lining, and 1:2½:5 for the tunnel lining, 5 per cent hydrated lime being added to the latter mix for workability. The use of rock as fine aggregate produces a harsh mix that is hard to handle without an admixture, especially after a long haul.

All concrete is being placed from three plants, one at the intake, one at Mount Sterling Creek crossing serving two headings and one at the outlet portal. All plants are of substantially the same design, equipped with complete crushing and sand-making units, weighing batchers, and 1-cu.yd. mixers, all electrically operated. The two portal plants are charged by elevating buckets, and the Mount Sterling plant by a derrick and clamshell. Cement for the two upper plants is transferred from the narrow-gage railroad in skips across the river by the two cableways.

Tunnel Plants—Three complete compressor and drill-sharpening plants were used, one at each portal and one at Mount Sterling Creek. Each plant had two 750-ft. electrically driven compressors, a storage battery charger,

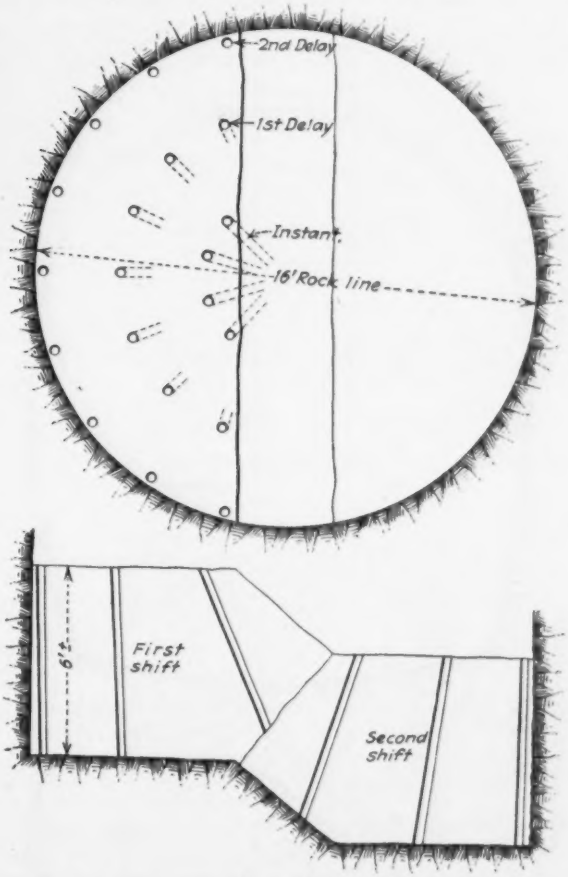


FIG. 7—SHOOTING DIAGRAM FOR SHAFT SINKING

oil furnaces and air drill sharpeners, and in addition the Mount Sterling plant has a drill-tempering machine. Complete camps are located at each of the tunnel plants.

Concrete Lining—A special steel form jumbo (Fig. 6) permits concreting without interrupting muck train operations. The jumbo consists essentially of a rolling steel frame straddling the narrow-gage tunnel track on movable rails placed on 6½-ft. gage. At the outer end the frame carries an inclined track 71 ft. long, over

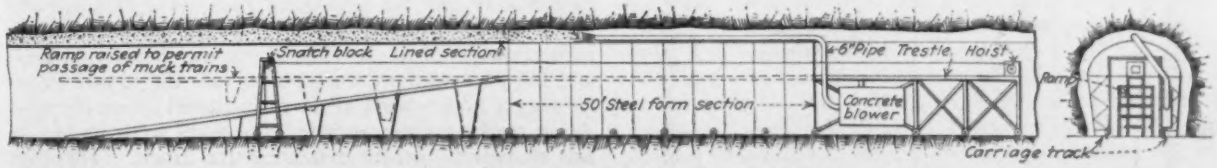
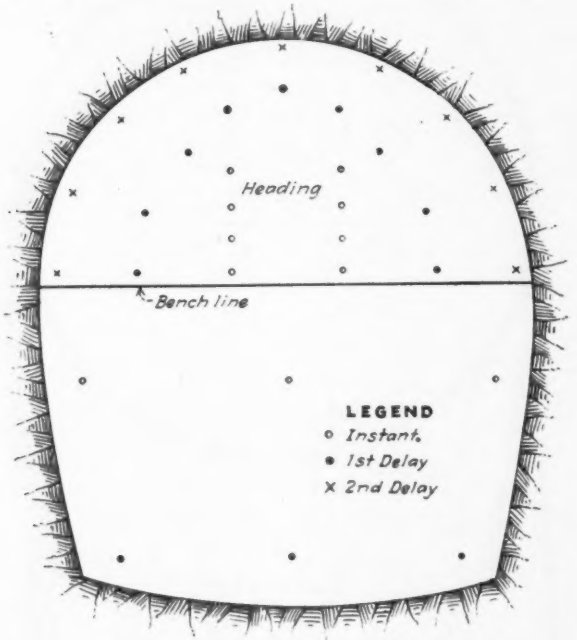


FIG. 6—SKETCH OF FORM JUMBO FOR TUNNEL LINING
Movable ramp track permits passage of muck trains underneath.

which the concrete cars run up to a level high enough to permit the passage of muck trains below. Hinged at the upper end, the entire incline is hoisted by a cable over an A-frame when necessary to permit the muck trains to pass. The center portion of the jumbo is a 50-ft. steel form section. The high level track extends through the form and beyond far enough to hold a six-car concrete train. Directly behind the form and below the concrete track on one side is located a pneumatic concrete-placing machine with ½-cu.yd. batch capacity.

In concreting, trains of six side-dump cars of 1-cu.yd. capacity are pushed to the foot of the ramp, uncoupled from the engine and pulled up the incline by a hoist and cable. The hoist pulls the cars through the form, where they are dumped into a long trough feeding the pneumatic machine. From the machine the concrete is blown to place through a 6-in. pipe. This pipe is placed above the form at the crown, and a steel deflector on the end of the pipe helps to force the concrete to the sidewalls.



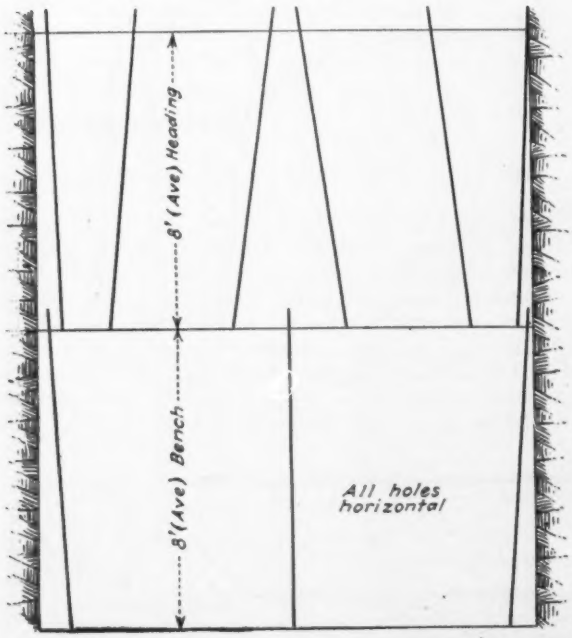


FIG. 8—SHOOTING DIAGRAM FOR TUNNEL DRIVING

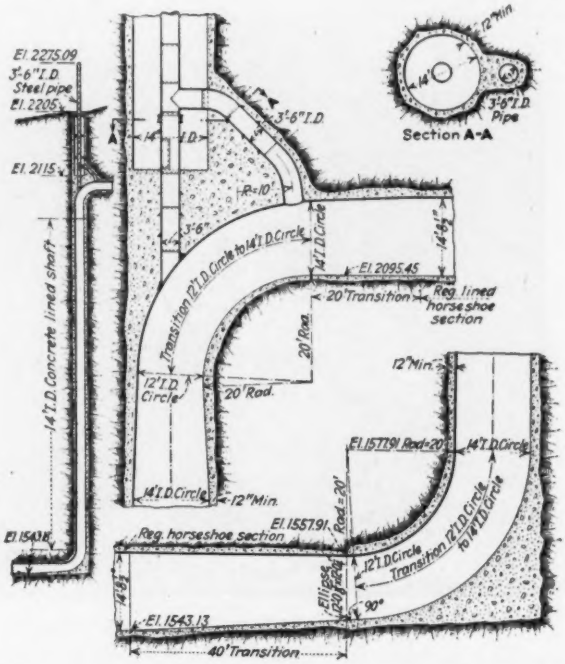


FIG. 9—DETAIL OF GAP SHAFT, SHOWING TRANSITIONS

The concrete supply pipe is jointed in 5-ft. lengths. At the start of a pour the pipe runs nearly the full length of the form, the pipe lengths being removed one at a time as the form fills up. To provide access to the concrete placing, the crown sections of the steel form, also in 5-ft. lengths, are left out at the start, being placed one by one as the lining progresses. Grout pipes, 2 in. in diameter, are placed at regular intervals, fastened to the forms by bushings which are removed before moving the forms, leaving the pipe flush with the concrete. The entire tunnel will be grouted under pressure through these grout holes.

Sidewall footings, seen in Fig. 4, are poured ahead of the arch lining. Steel forms hung from dowels in the tunnel walls are used, braced by timbers to the track. Concrete is placed in the footings by hand and the concrete trains must keep clear of muck trains. The inverts will be poured after all excavation is completed, starting inside the tunnel and working toward the portals.

At Gap shaft the lining was placed by hand in 5-ft. lifts, being brought in at the upper tunnel level. Upon reaching the shaft the concrete was dumped into buckets handled by a hoist at the surface. At the surge shaft the concrete was brought in from the outlet portal, transferred to buckets and hoisted to place from the top. Steel forms were used in both shafts.

Sections of the 8-ft. penstock pipes, weighing approximately one ton per linear foot, were skidded into place in the penstock tunnels from the portal over the rails shown in Fig. 1. The track was heavily greased and the pipe sections were pulled into the tunnel by an air tugger hoist placed in the main tunnel above the wye. After reaching their positions, the pipes were jacked up far enough to permit removing the track. The pipe sections were then riveted together and backfilled with concrete.

Personnel—The tunnel was started March 1, 1927, and is expected to be completed late this year. The Waterville hydro-electric development is being built for the Carolina Power & Light Company by the Phoenix Utility Company, of New York. H. F. Lincoln is general superintendent in charge of the local operations. Parker-Graham-Sexton, Inc., and the Pigeon River Tunnel Company, both of Paterson, N. J., are subcontractors on the tunnel portion of the project. Robert E. Parker is general superintendent and Frank C. Sellnow is chief engineer for the subcontractors.

Simple Method of Varying Head in Testing Drainage Pumps

Partial Breaking of Vacuum at Manhole Gives Increased Head Without Waiting for Change in Water Level

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Prepared Under the Direction of
S. H. McCrory
Chief, Division of Agricultural Engineering

TESTS of three drainage pumping plants, in which the total head was increased by admitting air into the discharge pipe and partly breaking the vacuum, have been made by engineers of the Division of Agricultural Engineering of the Bureau of Public Roads. No record could be found where this method of varying the head had been used previously in tests of drainage pumps.

Drainage pumping plants in the upper Mississippi Valley operate against a wide range of total heads, due to fluctuations in the river levels as well as in the levels of the suction bays. The heads usually vary as much as 10 to 15 ft. between maximum and minimum, whereas the maximum heads do not exceed 25 ft. The drainage pumps throw much more water when operating against low than against higher heads. To determine the performance of the pumps under various heads, it has been the practice to wait for the river to rise or fall to produce the desired condition. With this method, only one point on the rating curve could be determined at each test; then it might be necessary to wait several months or even longer to get a head which varied a few feet from the previous one. By using the method here described, a complete rating curve can be determined during one set of tests made at a time of low static lift.

Most of the discharge pipes of the drainage pumps in the upper Mississippi Valley go over the tops of the levees. At the high point in the discharge pipe a vacuum is created, and the discharge pipe acts as a siphon. By admitting air, the vacuum is partly broken and the head against which the pump is operating is increased. By controlling the amount of air admitted into the discharge pipe, any total head within certain limits may be obtained. The highest total head that can be obtained is equal to that which will occur when the discharge pipe is flowing under atmospheric pressure at the point of admitting the air. For instance, if a discharge pipe has a vacuum equivalent to 10 ft. of water where air is to be admitted, then the head on the pump can be increased almost 10 ft. by entirely breaking the vacuum. It cannot be increased quite 10 ft., as the friction losses would decrease due to the smaller pump discharge. If the point of admission of the air is at an elevation high enough and sufficient air is admitted into the pipe, the total head may be increased above that of the pump shut-off point and no water will be discharged by the pump.

TABLE I—RESULTS OF TESTS OF MCGEE CREEK PUMPING PLANT (PUMP NO. 2)

1928	Total Head on Pump, Ft.	Speed of Pump, R.P.M.	Discharge, G.P.M.
May 4	16.0	351	21,650
May 4	17.6	352	20,820
May 4	17.4	353	20,820
May 4	18.0	352	20,310
May 4	19.0	355	20,220
May 4	21.4	352	18,120
May 9	14.0	335	21,240
May 4	18.0	336	18,200
May 4	19.9	336	16,480
May 4	21.4	337	15,760
May 9	13.2	318	19,680
May 9	16.0	320	17,860
May 9	18.4	321	15,980
May 9	19.9	323	14,870
May 9	20.4	324	14,580

TABLE II—RESULTS OF TESTS OF HUNT PUMPING PLANT (PUMP NO. 1)

Date 1928	Total Head on Pump, Ft.	Speed of Pump, R.P.M.	Discharge G.P.M.
June 1-2	11.8	225	38,900
June 1-2	12.5	225	38,130
June 1-2	14.9	225	35,740
June 1-2	17.5	225	32,160
June 1-2	19.7	225	28,310
June 1-2	22.0	225	20,930
June 1-2	12.0	257	43,150
June 1-2	14.5	257	42,130
June 1-2	16.7	257	41,320
June 1-2	19.2	257	39,870
June 1-2	21.6	257	38,210
June 1-2	23.5	257	35,450
June 1-2	24.7	257	34,440

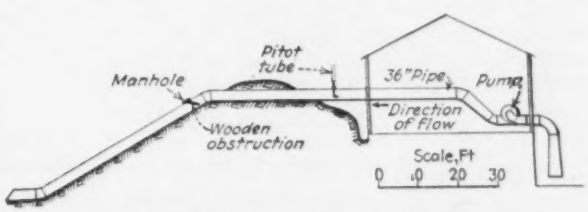


FIG. 1—ELEVATION OF SUCTION AND DISCHARGE PIPES, McGEE CREEK PUMPING PLANT, MEREDOSIA, ILL.

Tulane pitot tubes were used to determine the velocities in the discharge pipes, readings being taken at ten points on a vertical diameter of each pipe. Usually four readings of the velocity were taken at each point. The readings at the center lines were taken, but were not included in determining the discharges.

The suction head on the pump was measured by means of a mercury column near the suction flange of the pump. The pressure on the discharge side was measured by a column of water. The total head was computed from the suction and discharge heads, the proper correction being made for the difference in elevation between the suction and discharge measuring points. No correction was necessary for the velocity head, as in all the cases noted the pipe area at the point of measuring the suction head was equal to that at the point of measuring the discharge head.

This method of varying the total head by admitting air into the discharge pipe was tried first by the writer on the McGee Creek pumping plant near Meredosia, Ill., on March 21, 1928. Fig. 1 shows the elevation of the suction and discharge pipes. Removal of bolts from the manhole cover resulted in an increased total head on

the pump, but the discharge pipe at the pitot tube was running only partly full of water, so the discharge measurements were of doubtful value.

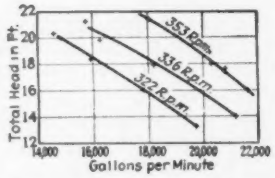


FIG. 2—TEST RESULTS OF PUMP NO. 2, McGEE CREEK 30-IN. CENTRIFUGAL PUMP, MAY 4 AND 9, 1928

Other tests were made on May 4 and 9, during which a wooden obstruction that covered approximately three-fourths of the pipe area was bolted to the manhole cover in the discharge pipe. This obstruction increased the total head to some extent and resulted in the discharge pipe running full of water during all tests. Air was then admitted in the discharge pipe by removing bolts from the manhole cover. The air sucked in was carried along with the water and caused a large disturbance in the discharge bay, which gave the appearance of an unusually high rate of discharge from the pump, when in reality the rate was reduced. The total head was varied from 13.2 to 21.4 ft. and the speed from approximately 318 to 355 r.p.m. The results of these tests are shown in Table I and Fig. 2. Had a time been selected when the river was at low stage, it would have been possible to test the plant from around 8 ft. up to 22 ft. total head. However, the high river stage and the necessary obstruction in the pipe limited the range in total head to that shown in the figure.

This method of testing pumps was used also at the Hunt drainage pumping plant near Warsaw, Ill. At this plant the discharge pipe comes to a point at the top of the levee. The pitot tube traverses were made at a point where the pipe would run full of water. Fig. 3 shows the profile of the discharge pipe. Bolts from the manhole cover were removed to admit air and increase the total head. When no bolts were out and the pipe was running with a full vacuum, the total head on the pump was 12 ft. at a pump speed of 257 r.p.m. When one

FIG. 3—ELEVATION OF DISCHARGE PIPE, HUNT PUMPING PLANT, WARSAW, ILL.

bolt was removed, the decreased vacuum in the discharge pipe resulted in an increase in total head to 14.5 ft. Two bolts removed resulted in 16.7 ft. total head; five bolts, in 21.6 ft.; eight bolts, 23.5 ft., and fourteen bolts removed resulted in 24.7 ft. total head. Table II and Fig. 4 show the results of the tests made on this plant, June 1 and 2, 1928. During the tests the total head on the pump was varied from 11.8 to 24.7 ft.

The Scott County pumping plant near Naples, Ill., was tested Sept. 13, 1928, using this method of varying the total head. The conditions at this plant are very similar to those existing at the Hunt pumping plant. In these tests the total head on the pump was increased from 7.7 to 19.5 ft. by admitting air into the discharge pipe.

The total head on a drainage pump can be increased by this method in any case where the discharge pipe is under vacuum. The method would be especially useful in making acceptance tests on drainage pumping plants. In the past much of the equipment installed in such plants has not been subjected to thorough acceptance tests. Probably one reason for this is the practice of specifying performance of the pump at or near the maximum head at which it will be operated; therefore it seemed of little use to make tests against lower heads. However, using the method described above, the engineer is able to increase the total head and to test the performance of any pumping plant where the discharge pipe passes over the top of the levee.

This method of varying the total head is believed superior to that of partly closing the gate valve that is sometimes placed in the discharge pipe, as comparative tests have shown that it gives a more uniform condition of flow in the pipe, especially at the higher heads. The gate valve is generally put very near the pump flange, and it is believed that the large reduction of area so close to the pump prevents normal rates of discharge being obtained. If the valve were located a considerable dis-

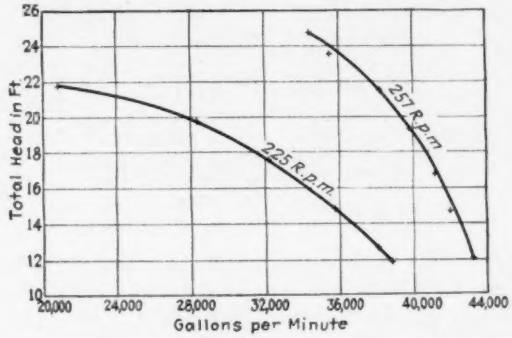


FIG. 4—TEST RESULTS, PUMP NO. 1, HUNT STATION 36-IN. CENTRIFUGAL PUMP, JUNE 1-2, 1928

tance from the pump, using it to control the head would probably be a satisfactory method.

The above tests were performed by the writer under the direction of S. H. McCrory, chief of the Division of Agricultural Engineering of the Bureau of Public Roads. Acknowledgment is made of the co-operation of the engineers of the Dayton-Dowd Pump Company during the tests of May 4 and 9 on the McGee Creek plant and those on the Hunt plant.

Painting in Damp Weather

Slow drying and wrinkling of paint are two troublesome characteristics often encountered in paint jobs carried out during cold and damp seasons, according to the *Dutch Boy Quarterly*, published by the National Lead Company. To wait for clear dry weather is the only certain remedy, but in case the painting must be done in damp weather, care should be taken to use a pure linseed oil reasonably free from "foots"; one of the principal causes of slow drying is the use of an inferior grade of linseed oil. Danger from wrinkling can be minimized by seeing that the finishing coat is well brushed out. Linseed oil will thicken in cold weather and it is this thickening which is the indirect cause of wrinkling. The immediate cause, however, is that the paint is applied too thick. Turpentine in the finishing coat will often thin the paint sufficiently so that it can be brushed out in a thin film. Although the use of turpentine removes some of the gloss from the finishing coat, the addition of small quantities not exceeding one quart to the standard finishing coat formula will not seriously affect it.

Increasing Height of Small Dam for New Canaan Water-Works

Earth Dam With Masonry Core Wall Raised Second Time Without Sacrifice of Storage or Interruption of Service

By O. H. Marchant

Engineer in Charge, With Albert B. Hill, New Haven, Conn.

A SECOND raising of an earth dam with masonry core-wall, impounding water for the supply of New Canaan, Conn., was carried out in 1928. No temporary or alternative supply being available, additions to the height of the dam had to be made without sacrifice of storage or interruption of the service to the town.

VIEW OF ENLARGED DAM FOR NEW CANAAN WATER-WORKS
Showing end of filter house below dam and new spillway channel. Old channel was between the filter house and the dam.

Interest in the work centers in the extension of the core-wall. When the dam was raised in 1910 the original masonry core-wall was carried up vertically with concrete. The embankment was also brought up to the new height, but the necessary widening could be made only on the downstream side. The increase in height was 10 ft.

When in 1928 it became necessary to add 6 ft. more to the height of the dam, it was, as in the first instance, impracticable to increase the width of the embankment on the upstream side and still keep the reservoir in service. To meet the situation a reinforced-concrete slab 17 ft. wide, varying in thickness from 12 to 20 in., was built on the top of the dam as it then stood, being placed as shown on the cross-section. This slab served to support a heavy retaining wall vertically over the old core-wall, together with the added embankment on top of the old dam. The foundation for the widening of the embankment on the downstream side was a heavy stone fill placed on and covered by layers of fine stone. The stone fill provided drainage and a stable support for the new rolled embankment. The completed dam is about 40 ft. high and 500 ft. long.

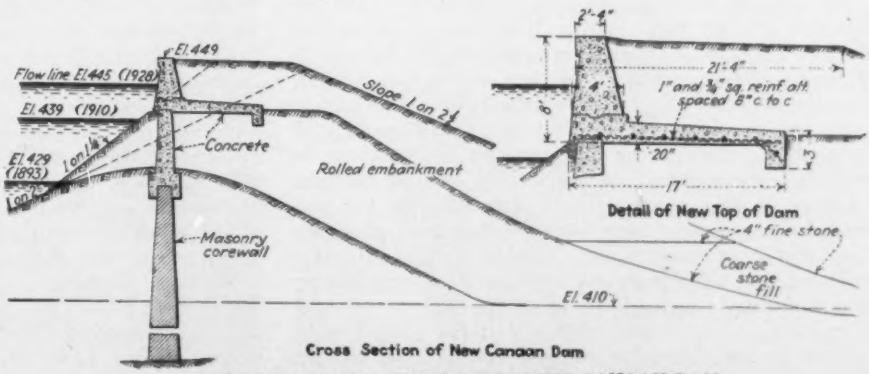
The old spillway was an ogee section 12 ft. high, founded and abutted on ledge rock. The old section was strengthened with concrete buttresses on the downstream side and a new ogee section was built thereon. A new spillway channel was built with concrete floor and side walls, in part on a loose stone fill in the old channel and in part on a new alignment. The intake gate house was raised. Adequate modern controls and screens were installed.

Alterations to the gate house necessitated the draining of all water from the well. This was done through the regular supply main by cutting it below the dam and above the pressure filters. Supply to the town was provided temporarily through a connection with the blowoff pipe. This temporary connection was arranged so that water could be drawn from near the surface of the reservoir, screened and delivered to the pressure filters the same as was done by the regular supply main.

Work was begun in June and completed in December, 1928, except for loaming and seeding. In the construction, 1,500 cu.yd. of stone fill, 10,700 cu.yd. of rolled embankment and 1,245 cu.yd. of concrete, plain and reinforced, were used.

The available storage is now 77,600,000 gal. (77.6 m.g.), an increase of 35 m.g. The total storage is 107 m.g. The estimated population of New Canaan is 2,200. The original dam was built in 1893.

The work was done for the Colonial Utilities Corporation, of New York, and Glidden, Morris & Company, owner of the New Canaan Water Company. It was carried out on a force account basis by Harold Mead, superintendent of the New Canaan Water Company. Design and supervision of construction was by A. B. Hill, consulting engineer, New Haven, Conn.



DETAILS OF SECOND ADDITION TO NEW CANAAN DAM
Apron and retaining wall built on old structure and earth added to top of bank and upper slope.

California Grade-Crossing Accidents Increase

Grade-crossing accidents in California during 1928 totaled 2,179, an increase of nearly 25 per cent over 1927, according to a report by the Railroad Commission, although the number killed in such accidents in 1928 was 165, as against 194 in 1927. At the same time the total number of motor vehicles registered in the state increased from 1,702,639 in 1927 to 1,822,262 in 1928. There are approximately 13,000 grade crossings in California, and additional crossings, including spur tracks, are being added at the rate of about 250 per year.

Sewage-Works Operation at Worcester, Mass.—II

Second of Three Articles Summarizing Experiences, Results and Lessons of Four Years' Operation of Grit Chambers, Imhoff Tanks, Sprinkling Filters and Final Settling Tanks

By Roy S. Lanphear
Supervising Chemist of Sewage-Works, Worcester, Mass.

Imhoff Tanks and Sludge-Drying Beds

THE FIRST of these articles dealt with preliminary treatment. The present article takes up intermediate treatment by Imhoff tanks and also the sludge-drying beds—the latter adopted from the old intermittent sand filters. The last article will deal with final treatment by sprinkling filters and secondary settling tanks. —EDITOR.

FROM the grit chambers and bar screens the sewage of Worcester passes through 2,200 ft. of 72-in. inverted siphon, then through a 72x30-in. Venturi meter located in a pit under the laboratory building. A type M register, indicator and recorder is located in the office.

Between the meter and the Imhoff tanks are located gates whereby sewage can be bypassed to the final effluent channel. It is necessary to bypass sewage in times of stormflow, as the sewer capacity is approximately 70,000,000 gal. daily (70 m.g.d.), while the gate arrangement in the Imhoff tanks will permit of the tanks handling but 51 m.g.d. Careful record is kept of the use of this bypass.

The twelve Imhoff tanks are each 61x90 ft. in plan and 31 ft. water depth with 2-ft. freeboard. Each tank has four sedimentation compartments, two over each row of three sludge hoppers. There are three 36-in. and two 18-in. gas vents extending nearly the full length of each tank, their area representing 21 per cent of the tank area. The sedimentation compartments are 11¼ ft. 3 in. wide, with vertical sides 4 ft. below water level and a trough bottom 7 ft. 11½ in. deep to the slot. The slope on the trough bottom is 1.5 on 1, the horizontal overlap of the slot 6 in. and the width of the slot 8 in. The capacity per capita is 1.34 cu.ft. The detention period provided by the design (28 m.g.d.) is 2.1 hours.

The capacity of the sludge compartments is 2.54 cu.ft. per capita. The slope on the hopper bottoms is 1 on 2; the hoppers are provided with 2-in. pipes, perforated with $\frac{3}{16}$-in. holes for sludge agitation with water. Sludge pipes are 8 in. in diameter.

The influent and effluent channels are between the two batteries of six tanks each. The sewage is carried through the effluent channel on either side of the sewage channel in 20-in. vitrified pipes and enters each tank at the two corners. Two outside channels and necessary gates are provided for reversal of flow through each tank. Regulation of the flow through the tank can be made by adjustment of the gates. No attempt has been made to do this, since tests of tank effluents for suspended solids content have indicated that they all accomplish nearly the same result. Sludge withdrawals have indicated that the fourth and fifth tanks in each battery receive slightly heavier loads of solids than do the four other tanks. The effluent channels of the Imhoff tanks combine in one channel at the end of the tanks and the effluent passes into the dosing tanks.

The Imhoff tanks have operated very successfully since they were started in June, 1925. Certain abnormal conditions cause difficulties of operation, but results to date indicate that these are being handled in an excellent manner. Sewage treated by the tanks contains doses of pickling liquor, tannery and lime wastes and dye- and wool-washing wastes. It is impossible for the tanks to remove during a detention period of three hours an excessively large amount of the suspended and colloidal matters which are present in doses in the sewage in consequence of these wastes. Stormflows from combined sewers make difficult the determination of the population equivalent of the industrial wastes. The results of

IMHOFF TANKS AT WORCESTER SEWAGE-WORKS
Twelve reversible-flow 61x90-ft. Imhoff tanks receive sewage which has passed through grit chambers with bar screens and discharge their effluent through screened channels to dosing tanks which feed sprinkling filters.

biological oxygen demand tests of the sewage during two years indicate that this figure will probably average about 120,000, while a single month might give a figure approximating 165,000. It may be of interest to recall that Worcester sewage without the present doses of lime wastes was successfully treated in an experimental Imhoff tank operated in 1911-13.

No scum has been removed from the gas vents since operation started. Measurement of the depth of scum in each end and the middle of one gas vent in each tank, Oct. 17, 1928, showed a maximum depth of 8½ ft. and a minimum of 1¾ ft. The average depth was from 5 to 6 ft. This represents an accumulation of about 7,000 cu.ft. of scum in the gas vents of each tank. During the 3½ years of operation about 28,000 m.g. of sewage has passed through the tanks. The scum is broken apart in many places every time sludge is drawn. The tank is out of service, and as the sewage level drops some scum adheres to the sidewalls of the vents, causing large openings in the scum. This may have a tendency to prevent excessive scum formation. During the summer, and in cold weather to a lesser extent, holes are opened in the scum, permitting gas to escape readily. Pointed wooden poles about 3½ in. in diameter are used.

Analysis of three samples of scum showed an average specific gravity of 0.931 and the percentage averages of various contents as follows: moisture, 74.6; fats, 32.3; volatile matter, 74.4; nitrogen (dry) 3.1; iron, 3.0.

Gas ebullition has always been quite vigorous, especially during warm weather. No attempt has been made to utilize the gas, because certain features of operation

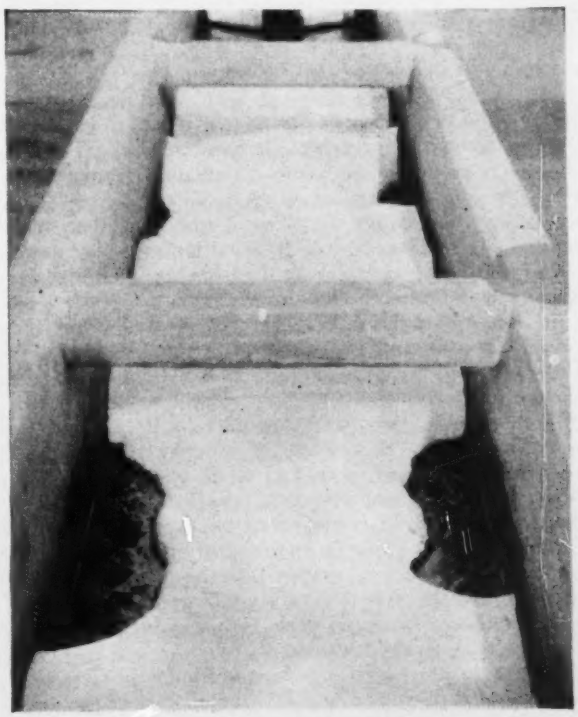
necessitated expenditure of all available funds. It is quite probable that as opportunity affords tests will be made. Analyses of the gas in late summer averaged as follows, in percentages:

Carbon dioxide	10.2	Methane	71.5
Heavy hydrocarbons	0.4	Hydrogen	10.9
Oxygen	0.5	Nitrogen	6.4
Carbon monoxide	0.0	Total	99.9

No serious difficulty has been experienced with foaming at any time. It has occurred a few times at different vents and has been attributed to excessive quantities of fresh sludge as compared with digested sludge. The usual and successful remedy has been to cut the tank out of operation for a day or more. It is realized that this remedy is not applicable to small plants in all cases.

Wire screens of ¼-in. mesh at Imhoff tank outlet weirs are quite generally used elsewhere. They catch matches, small grease balls, etc., which clog the filter nozzles if allowed to pass out in the tank effluent. At Worcester we demonstrated that no reduction was made in the suspended solids of the tank effluent unless ⅛-in. mesh screens were used at the end of each sedimentation compartment. The cost of removing, cleaning and replacing these screens was excessive. They also reduced the capacity of the tanks during stormflows. The presence of growth which detached itself from the tank channel walls and was being carried to the filter nozzles resulted in using 1-in. mesh wire screens at the ends of the two main effluent channels. These screens have proved very satisfactory. During stormflows the screens are raised when the capacity of the Imhoff tanks is reached.

Use of squeegees and drags on the slopes of the sedimentation compartments has been resorted to but very little. These few instances have been confind to slot clearing at the ends of the tanks, where the rags have sometimes held solids in the upper compartment. Only one tank has ever been drawn down so that the slot could be examined and no cause was found for the lodging of rags. These conditions are corrected as soon as observed. It is rather striking that the difficulty has been experienced with four tanks and always at the same end of the same compartment.



GAS VENTS IN IMHOFF TANKS
Snow-covered in this view, except where gas is bubbling through.

The presence of large quantities of grease, together with a small amount of oil, is the only source of disagreeable odor and the cause of an unsightly appearance about the Imhoff tanks. The first five tanks in each battery afford little or no trouble in the first respect but always have a small amount of grease on the surface of the sewage to detract from the good appearance of the tanks. The far inlet to the last tank in each battery is at the end of the sewage influent channel and results in much of the grease in the sewage entering the last two sedimentation compartments of these tanks. An average of nearly 800 cu.ft. of grease is removed each month from these four compartments.

At one time grease was removed from all tanks and put into the gas vents. While it is claimed by some that this procedure results in no complications if not carried to excess, our gas vent walls became dirty and contained a foul appearing and smelling scum. A second experiment, also unsatisfactory, was the use of a galvanized-iron trough about 8 in. wide and long enough to cover the width of a sedimentation compartment. The bottom sloped to one end, where there was a pocket of ample size for the 3-in. hose of a diaphragm pump. The trough was held by supports just inside the scum board. The side nearest the tank was cut slightly lower so that, using a water hose, the grease was skimmed into the trough and pumped into the gas vents or the sewage channel, where it could pass into the last two tanks. Matches caused so much trouble with the pump that this method was abandoned. One concern submitted a proposition for a piping system about the tanks with the use of a portable suction skimmer. The cost appeared exorbitant and the matter was dropped.

The present method of grease removal has been used for more than two years and has proved very satisfactory. A 12-in. vitrified pipe line was laid from outside the end walls of the last tank in each battery, at a point between the two compartments which receive the heavy load of grease, and extended to waste areas north and south of the tanks. Concrete chambers were constructed as entrances to the pipe lines. Stagings were placed and iron troughs supported so as to discharge skimmings into these chambers. Skimmers are galvanized-iron pans 10 in. in diameter, perforated with ¼-in. holes and having 8-ft. handles. A small stream of city water in the trough helps to carry away the skimmings. City water is supplied at a very low cost; otherwise, a small portable pump using tank water would prove economical. A 6-in. pipe line was of inadequate size in the winter when the grease was removed in large pieces. This method is reasonably clean.

At a near-by plant, where the tanks are in a single battery, considerable success has followed the use of water sprays for moving grease to either end of the tank. Worcester tanks are in two batteries and grease removal at the inside ends is not desirable. Practice here is to reverse the flow of sewage in these two tanks twice each month. When the grease accumulation is back of the scum-board at the inside end of the tanks, sludge is drawn until the grease can be flushed to the outer end of the tank, where it is removed as soon as the tank is filled. The waste areas mentioned include the winter sludge

lagoon and a small sand-filter area. Suitable weather conditions have permitted of burning the grease on the latter area.

Grease removal from the surface of the sewage in the first five tanks in each battery is made two or three times yearly. This is done by drawing sludge from the last tank in a battery; the following morning, during low sewage flow, all effluent gates of the tanks in that battery are closed; the screen at the end of the effluent channel is replaced by a stop-plank gate, and the further inlet gate of the last tank is opened. The gates of the other tanks are opened one at a time while the grease is moved with water streams to the effluent channel and passes into the last tank, where it is removed in the usual manner.

Reversal of sewage flow in the tanks is made once a month with the exceptions mentioned. The tank channels are cleaned when changed from sewage to effluent carriers. Direction of sewage flow is usually the same in each battery, north or south.

The average quantity of sewage treated was 21.11 m.g. in 1927 and 22.82 in 1928. The average detention of the sewage was 2.7 and 2.5 hours respectively.

The efficiency of Imhoff tank treatment of sewage is generally determined from such data as are presented in the accompanying table.

REDUCTION IN SOLIDS AND B. O. D. BY WORCESTER IMHOFF TANKS

All tests made on daily composite hourly samples taken approximately in proportion to the sewage flow.

	1927			1928		
	Sew.	Eff.	% Rem.	Sew.	Eff.	% Rem.
Settleable solids, c.c. per liter, 1 hr.	15.06	1.47	90.2	10.57	0.77	92.7
2 hr.	13.74	2.20	83.9	10.39	1.28	87.7
Suspended solids, p.p.m.	288	127	55.9	275	114	58.6
Biochemical oxygen demand, p.p.m.	150.5	88.6	41.1	152.9	98.8	35.4

The pH of the sewage varies so widely on account of doses of industrial wastes that this determination is not made regularly. Daily composite hourly samples gave from 6.2 to 6.8 pH values for both sewage and tank effluent, while that of catch samples of sewage varied from 2.8 to 9.3. No attempt has been made to condition the sewage entering the Imhoff tanks so that the entire sludge content will have pH values above 7.

Imhoff tank sludge production in 1927 was 22.6 m.g., containing 4,651.4 tons, or 4.93 per cent, of dry solids. In 1928, 17.4 m.g. was produced, containing 4,504.2 tons, or 6.21 per cent, of dry solids. Iron and lime wastes in the sewage contribute to this large sludge production. The excessive amount of lime wastes did not appear in the sewage until work on the present plant had been under way nearly four years. Precedent, long established, allows any waste to be discharged into the sewers provided it does not injure them.

The sludge storage capacity of the Imhoff tanks is 4.617 m.g. The rate of sludge production permits of a storage period of from eight to twelve weeks depending on the volume of digested sludge drawn. In other words, the rate of withdrawal of sludge is such as to include the contents of the hoppers and from 1 to 2 ft. of the sludge above the hoppers each month. At times the rate of accumulation of sludge is rapid due to the so-called "doses" of industrial waste in the sewage. This, together with the attempt to hold the sludge as long as possible, requires that careful attention be given to the tanks. Measurements are made monthly of the depth of sludge in each tank. This is done with a small hand pump and hose at both ends of each tank.

REMOVING GREASE FROM WORCESTER'S IMHOFF TANKS

Skimmers are perforated. Grease flows through troughs supplied with city water and is discharged into chambers from which vitrified pipe carries the grease for deposit on waste land.

Owing to inadequate size of the water-supply pipe until quite recently, the agitator system in the sludge hoppers has not had a thorough trial. Experience with rags clogging the entrance to the sludge pipe at the bottom of the hopper has shown that this system is not wholly efficient under the existing conditions. Dislodging of these rags has been done by pumping water or sludge from the secondary settling tanks, this operation being repeated as many as three or four times during a single drawing of sludge. Water service under considerable pressure and volume from a nozzle directly at the entrance to the pipe might prove successful.

Digestion of sludge has become an important feature of sewage-treatment work. The pH of the sludge and its relation to digestion of the sludge is one of the first considerations. Variations of the pH of Worcester sewage has been mentioned. The pH of the top sludge in the lower compartment is usually from 6.6 to 6.9, while that of the sludge drawn is from 7 to 7.2. This condition has prevailed since tank operation was well started. It has been well demonstrated that it is not essential that Worcester sewage should have a pH of 7 or higher in order to obtain successful sludge digestion. The pH of the fresh sludge is below 7; alkaline fermentation raises the pH during digestion to 7 and 7.2. These results are interesting in view of the fact that well-digested sludge was obtained in from ten to eleven weeks in normal plant operation. Reasonably well-digested sludge was obtained in eight weeks.

As stated, yearly figures showed a sludge production of 22.63 m.g. containing 4,651.4 tons of dry solids in 1927 and 17.41 m.g. containing 4,504.2 tons of dry solids in 1928. The percentage of volatile suspended matter in the sewage was 65.3 and 62.1 in 1927 and 1928 respectively. The percentage of volatile matter in the two sludges averaged 54.66 and 49.07 respectively, indicating that the longer storage period afforded in 1928 resulted in a material reduction of the organic content of the sludge. The difference in the rates of sludge production in the two years represented average storage periods of approximately eight weeks in 1927 and twelve weeks in 1928. Sludge with pH close to 7 was better digested in twelve than in eight weeks.

Rudolfs, in writing of digestion of sludge in Germany, has mentioned the apparently favorable effect of the presence of iron in the sludge upon the period of time required for digestion. The iron content of Worcester sludge, 5.27 per cent, was greater in 1927 than in 1928,

BAR SCREENS IN EFFLUENT CHANNELS OF IMHOFF TANKS

Screens are of 1-in. mesh and are located just behind the grating platform in the foreground and just below the diagonally placed drop-plank. Laboratory and administration building in background.

when it averaged 4.43 per cent. Comparison of late summer and fall periods of the two years gave the following results:

August, September, October, November	1927	1928
Thousand gallons of sludge drawn	5,104	5,636
Percentage volatile solids	48.87	45.22
Percentage iron	4.60	4.22

While the presence of iron may be beneficial, all of these results tend to indicate that the better-digested sludge was obtained when the iron content was smaller. Another conclusion which might be considered is that the length of the period of digestion, with favorable pH conditions, is more important than the iron content of the sludge, if the latter does not exceed 5 per cent.

Comparison of the foregoing data with those obtained during the operation of the experimental Imhoff tank, 1911 to 1913, is interesting. The pH of the sewage sludge was not obtained or determined at that time, but the writer knows that the lime wastes were not in the sewage during the operation of that plant. Undoubtedly, the sewage was more acid than is our present sewage. The storage period of the sludge was five months and later reduced to three and to one and a half months, the latter period being when humus sludge was pumped into the Imhoff tank. The conclusion was that three months was sufficient storage for digestion of Imhoff tank sludge obtained at that time. The iron content of the sludge averaged 5.5 per cent and the volatile matter in the digested sludge 48.46 per cent.

Sludge with lower pH stored for five and later for only three months was apparently as well digested, as was the present tank sludge with pH of 6.8 to 7.2 stored for two months. The latter sludge was better digested when the storage was increased to three months. Acid sludge apparently digests more rapidly as pH 7 is approached, while the period of storage becomes important as pH 7 is obtained. It is unfortunate that we do not know the pH of the sludge in the experimental tank, because well-digested sludge was obtained when indications pointed to a relatively low pH.

Imhoff tank sludge is dried on 23 one-acre old intermittent sand filters, giving about 4.9 sq.ft. per capita for both Imhoff and secondary tank sludge. The sludge is drawn on to the drying beds to a depth of from 10 to 18 in.; dried sludge has varied considerably in depth. No difficulties have been experienced in drying Imhoff tank sludge. Dried sludge is removed from April to December. Ample drying area is always available during the summer season; during the winter sludge has been drawn into a lagoon. Experience has demonstrated that 8-in. sludge pipe is preferable to 6-in. if screening of sewage is limited to 2-in. bar screens. The drying area should be adjacent to the tanks and the distribution system should be as short and as straight as possible.

Removal of dried sludge of from 6 to 9 in. in depth by machine is more economical than removal of lesser depths. Dried sludge is moved into windrows by a horse-drawn road scraper. The sludge is then loaded into carts with a bucket loader and carted to a dump, a distance of from 300 to 1,000 ft. The operating gang consists of three men, the machine operator and a ground man, who alternate their work, and a dump man. From three to five double teams are used. The labor and teaming cost averages slightly less than 50c., whereas hand shoveling costs about 90c. per cubic yard. During 1928, 16,229 cu.yd. of dried sludge was removed; the saving of machine cleaning over hand shoveling represented nearly $6,500. Oil is changed in the loader each week and the gasoline consumption amounts to slightly more than 1 gal. per hour. Careful operation of the loader results in what might be considered the loss of only a reasonable quantity of sand. The presence of this sand is a serious drawback in advocating the use of sludge by farmers. Careful grading of the surface of the drying bed after cleaning is essential; the usual practice is to harrow and brush the bed.

Farmers have removed a small quantity of sludge which has been given to them. Possibly if a charge were made, more farmers might be induced to use the sludge. Tests of Worcester Imhoff tank sludge made at the Massachusetts Agricultural College showed that it had excellent fertilizing properties. Present plans include the cultivation of a plot of land during the coming year for the purpose of demonstrating the value of Worcester sludge as a fertilizer.

Difficulties in discharging sludge to remote areas have resulted in greater depths of wet sludge on near beds with increased lengths of drying periods. The economical depth of dry sludge for loader cleaning has been exceeded. For these reasons the writer has proposed the division of the nearest row of drying beds into double the number of units, all with 8-in. pipe delivery of wet sludge. Proper spacing of sludge drawings with reasonably good drying weather should not require more than the ten beds for drying of Imhoff tank sludge. This area represents about 1 sq.ft. per capita.

In a plant of the size of that at Worcester a certain portion of the labor and supplies is indirectly chargeable to all units of the plant. Certain improvements or changes cause variation in the yearly charges to the different units. The annual cost of operation of the Imhoff tanks was $1.40 in 1927 and $1.73 in 1928 per million gallons of sewage treated. Sludge disposal is a separate account.

Reclamation Project Planned in Holland

A reclamation project similar to the Zuiderzee drainage work in Holland is planned on the west coast of Schleswig, in north Germany. The island of Westerland is already connected to the continent by a 10-mile dike. By connecting this island with the island of Wky, and continuing thence to the continent, involving the construction of 8 miles of dikes, a vast amount of territory can be reclaimed.

Contractor Held Liable for Use of Creosote Substitute

Court Finds Substitution "Fraudulent" in Treatment Uses on Wood Piling for Ocean Beach Amusement Pier at San Diego

A COURT decision which clearly defines the responsibility of a contractor in wood-preservative treatment was handed down by Judge Thomas L. Ambrose of the California Superior Court at Los Angeles on May 11. Suit was brought by the Crystal Pier Amusement Company of San Diego against Emil F. Cykler and others associated in the California Creosoting & Timber Company. Dispute arose over the fact that the latter company contracted to build a pier using piles and timbers treated with coal-tar creosote; the pier was built and soon after its completion the piles that were supposed to have been treated with creosote were found to be undergoing a vigorous attack by marine borers. Owners of the pier then had the preservative analyzed and found it to be a solution consisting of 10 per cent cresylic acid and 90 per cent fuel oil, whereupon suit against the contractor was instituted. Some of the elements of the decision, which found plaintiff entitled to recover from the contractor not only the value of the pier itself but also of the superstructure built thereon (a total of $91,961), are reviewed in the following:

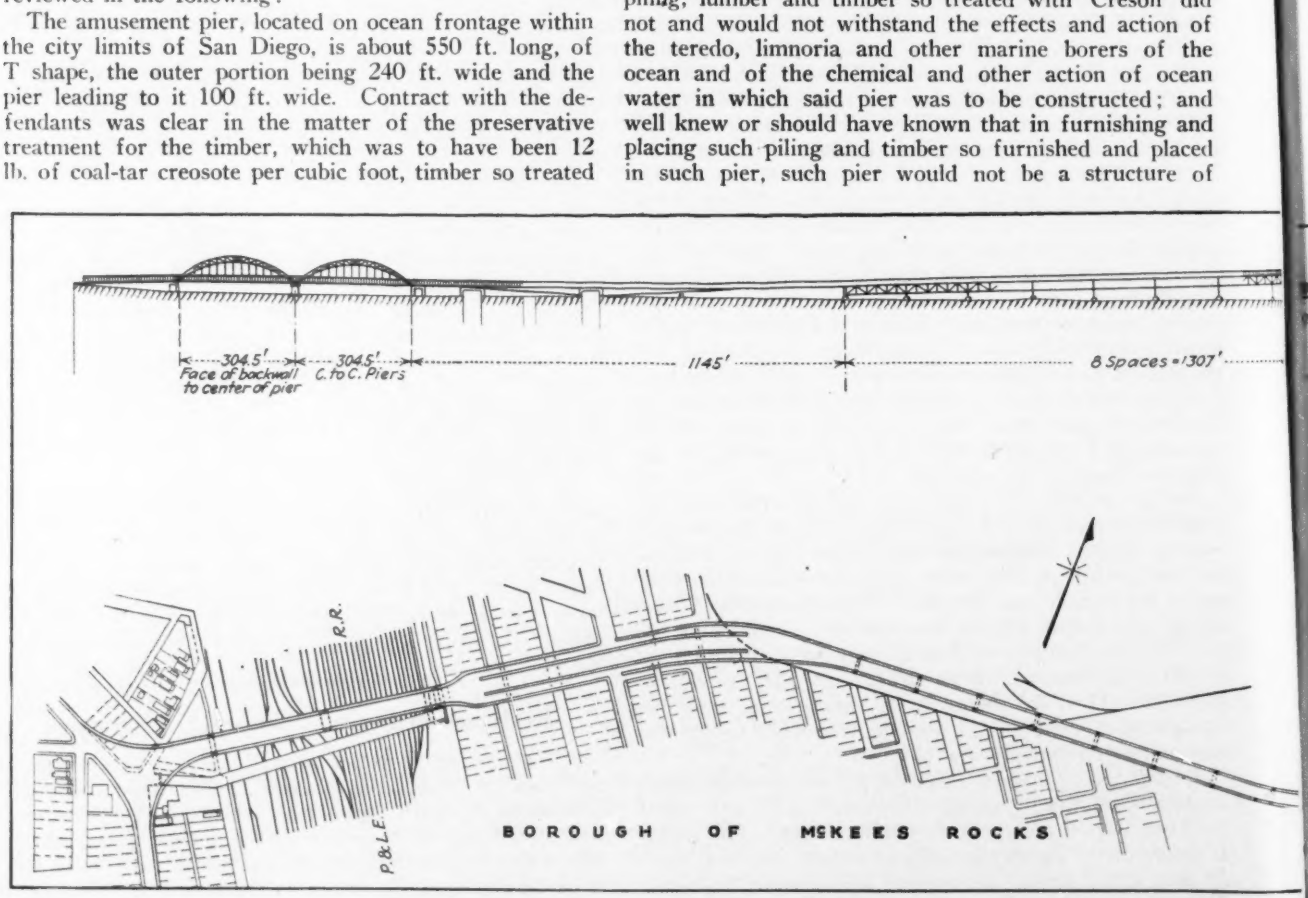
The amusement pier, located on ocean frontage within the city limits of San Diego, is about 550 ft. long, of T shape, the outer portion being 240 ft. wide and the pier leading to it 100 ft. wide. Contract with the defendants was clear in the matter of the preservative treatment for the timber, which was to have been 12 lb. of coal-tar creosote per cubic foot, timber so treated being represented as having a life in excess of 25 years by virtue of the resistance to marine borers and to chemical action afforded by the preservative.

The contract prices for the treated timber were 70c. per linear foot for piling and $65 per 1,000 ft.b.m. for lumber and timber. Under the contract the defendant was to supply all materials, treat the timber and construct the pier, the total price on this part of the work being $41,000. When the pier was completed the plaintiff then erected thereon several superstructures, including a ballroom. The contract was awarded March 17, 1926, the pier with its superstructure was completed about July, 1927, and plaintiff did not discover the defections in carrying out the contract until September, 1927.

The defendants furnished treated timber and erected a pier of the prescribed dimensions, but instead of the prescribed coal-tar creosote the contractors used in their treatment "an inferior material known as and called 'Cresoil'," which is not used in the wood-preserving industry for treatment of timber to be used in marine structures.

"The defendant was thoroughly aware of the fact that the waters where this pier was built were infested with marine borers; that the plaintiffs intended to build a large pavilion on the end of the pier and, furthermore, that the usual practice in the preservation of piling and timbers for marine purposes is to impregnate them with creosote and that coal-tar creosote only is known and called 'creosote' in the wood-preserving industry. . . .

"Defendants should have known at that time that piling, lumber and timber so treated with 'Cresoil' did not and would not withstand the effects and action of the teredo, limnoria and other marine borers of the ocean and of the chemical and other action of ocean water in which said pier was to be constructed; and well knew or should have known that in furnishing and placing such piling and timber so furnished and placed in such pier, such pier would not be a structure of



LOCATION AND STRUCTURAL TYPE OF NEW BRIDGE OVER THE OHIO RIVER
West end of bridge will connect with left bank highway, one of the main routes north and to be built along the right bank.

long life, but that the same would in a short time become unsafe and of no use for an amusement pier. . . .

"By reason of the false and fraudulent act of the defendants . . . in furnishing, driving and installing piling, timber and lumber in said pier, not treated with creosote . . . the piling thereunder . . . have become attacked and riddled by the teredo, limnoria and other marine animal life. That such timber and piling treated with 'Cresoil' as hereinbefore set forth did not and could not withstand the effect and action of the teredo, limnoria and other marine borers of the ocean and of ocean water, so that said pier is now unsafe for use as an amusement pier or any other purpose, and three-fourths of said pier will have to be torn out and replaced and said ballroom and structures thereon will have to be torn down and replaced."

Steel Arch of 800-Ft. Span to Cross Ohio River

Allegheny County Begins Construction on Large Highway Structure to Connect McKees Rocks With Northern Districts of Pittsburgh

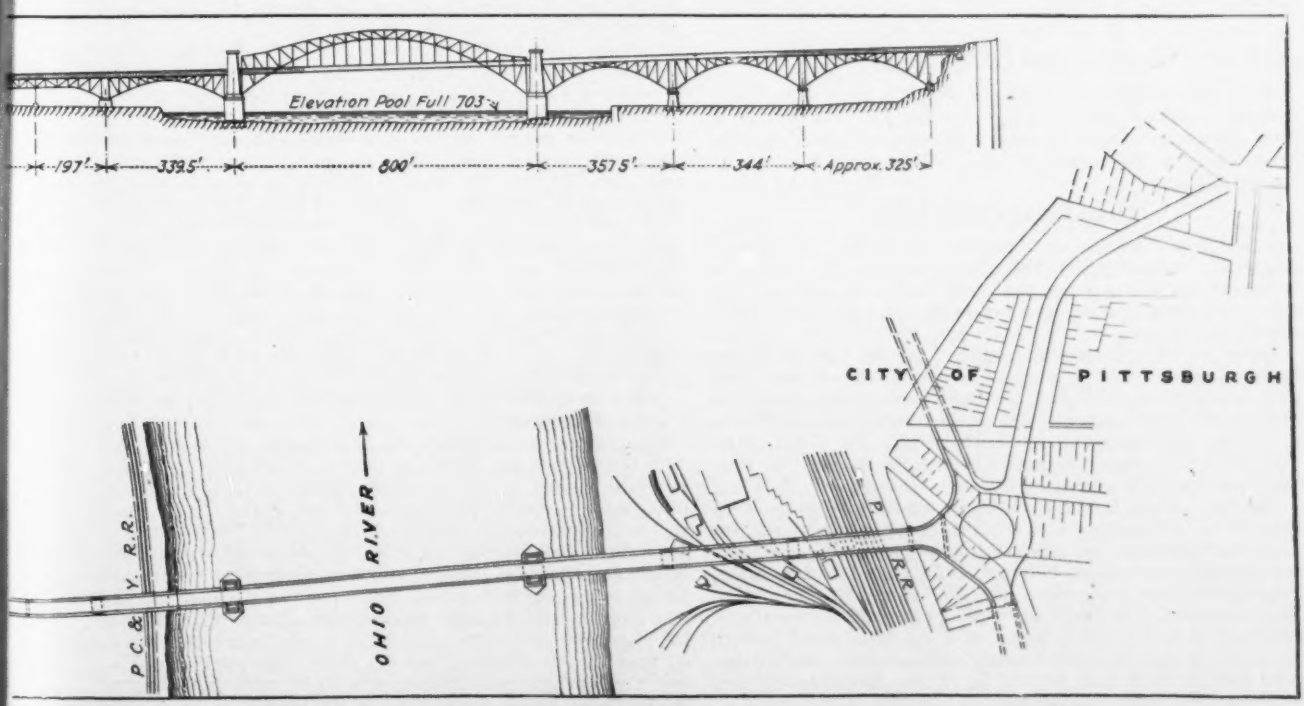
CONSTRUCTION of a highway bridge across the Ohio, a long and costly structure which includes the remarkable feature of an 800-ft. arch span, is just being begun by Allegheny County, Pa., which contains the city of Pittsburgh. It will be the only highway crossing within many miles from the head of the Ohio River at the Point to Sewickley. At the former location the county two years ago replaced the noted old chain suspension bridge, the Point bridge, by a remarkable cantilever arch structure (see *Engineering News-Record*, July 16, 1925, p. 107), while at Sewickley the county built a cantilever bridge of 750-ft. span a number of years ago. The new structure at McKees Rocks, however, will be much more than a local traffic route, inasmuch as it will connect the main highways extending along the east and along the left and right banks of the Ohio in such a way as to serve a large amount of through traffic. For improvement of traffic conditions along the right bank, where the present main route is a narrow and tortuous street running through a continuous chain of urban districts and contiguous suburban towns, a boldly conceived side-hill boulevard on new alignment is being built.

The principal features of the McKees Rocks bridge are set forth clearly in the drawing herewith. The main channel span is a steel arch of the Hell Gate type 800 ft. long between pier centers. It is flanked by four spandrel-braced arches with horizontal top chord, about 340 ft. long between pier centers and nine deck trusses of about 160-ft. span. At the west end are arches with floor ties, crossing the tracks of the Pittsburgh & Lake Erie Railroad. The roadway is to be 40 ft. wide, and in addition there will be two 6-ft. sidewalks.

At the west end the bridge will connect with Island Ave. in McKees Rocks, and at its east end with a traffic circle formed in the new Ohio River Boulevard, thence making connection with California Ave. in Pittsburgh.

The two piers of the main arch and three adjoining piers will be concrete structures faced with granite, while the other elements of the masonry substructure are to be reinforced concrete faced with concrete of granite chip aggregate, bush-hammered.

The substructure is estimated to cost $1,900,000; the bridge as a whole, including approaches and property damages, will call for an expenditure of $7,000,000. The design was carried out by the county's Department of Public Works, under Norman F. Brown, director, W. H. R. Kreiling assistant director, V. R. Covell chief engineer of the Bureau of Bridges, A. D. Nutter engineer of bridge design, and A. A. Henderson engineer of bridge construction.



WHICH ALLEGHENY COUNTY IS PREPARING TO BUILD AT McKEES ROCKS
west out of Pittsburgh, while the east end will tie in directly with a new side-hill thoroughfare known as the Ohio River Boulevard.

Engineering Features of Flood-Control Plan Not Subject to Change by President

Attorney General Rules That President Hoover May Not Now Review Engineering Features of Flood-Control Plan for the Mississippi River—President Coolidge's Approval of Special Board Report Fixed the Plan—Attorney General Will Not Rule on Flowage Rights Question, as It Is Now Before the Courts

RECONSIDERATION of the plan for Mississippi River flood control was proposed to President Hoover during the latter part of May by a group of Senators and Representatives from the Mississippi Valley who felt that changes should be made in the plan before contracts were let for certain parts which have been the subject of much question. This group believed that although President Coolidge had promulgated the Jadwin plan by an executive order, the fact that he had announced that he did not approve of the portion of the report of the special board appointed by Congress to pass upon the differences between the Jadwin plan and the Mississippi River Commission plan which dealt with the compensation for property had left the whole matter open and subject to further review by the Executive. As President Hoover was in doubt on this point, he referred the matter to William D. Mitchell, Attorney General. The latter has announced that in his opinion the engineering plans cannot now be changed except by Congress. On the subject of payment for flowage rights he states that he cannot make a ruling at this time, as that subject is before the courts.

The report of the Attorney General to the Secretary of War which contains his opinion on these two subjects is given in the following abstract, which is complete except for a section of the flood-control act which the Attorney General quoted in full, and a quotation from the decision of a former Attorney General upon the legal status of acts of the President.

In the matter of your inquiry of May 27, 1929, concerning certain questions arising under the act of May 15, 1928, 70th Congress, First Session, otherwise known as the Mississippi flood-control act, I have the honor to advise you as follows:

Flood-Control Plan Fixed

Your first question is whether the project in House document, 70th Congress, First Session, is the legal project to be executed in accordance with law, and whether this project is already fixed and not subject to review by this administration.

From an examination of section 1 of the act there can be no question that a project is contemplated, and that such project is identified as the engineering plan set forth and recommended in the report submitted by the Chief of Engineers to the Secretary of War, dated Dec. 1, 1927, and known as House document 90, 70th Congress, First Session.

The fact that a board is therein created to consider the engineering differences between the above project and the plan recommended by the Mississippi River Commission in a special report dated Nov. 28, 1927, such board to make recommendations thereon to the President, the President being empowered to decide all recommendations or questions submitted to him by such board, does not alter the fact that the act of Congress made the engineering plan referred to, dated Dec. 1, 1927, and printed in House document 90, the project to be thereafter executed, as provided in the act.

The act refers to such project several times as "the project," "the adopted project," "such project," "project herein adopted," "this project," showing that Congress contemplated and intended authorizing a specific project, which is identified by the act as the aforesaid engineering plan dated Dec. 1, 1927, and printed in House document 90.

In my opinion, the project thus authorized by the act of May 15, 1928, is thus identified and now fixed and is not subject to change save by future Congressional action.

It appears from section 1 of the act that in addition to the plan submitted by the Chief of Engineers under date of Dec. 1, 1927, another plan had been recommended by the Mississippi River Commission in its special report dated Nov. 28, 1927, and that there were certain engineering differences between it and the plan of Dec. 1, 1927. It is evident that Congress did not wish to pass upon these engineering differences, and therefore created a special board which "is authorized and directed to consider the *engineering* differences between the adopted project and the plans recommended by the Mississippi River Commission in its special report dated Nov. 28, 1927." It is made the duty of the board, after giving such engineering differences due consideration, "to recommend to the President such action as it may deem necessary to be taken in respect to such engineering differences." The act then provides that the foregoing function on the part of such special board was the limit of its authority.

We have, then, the adoption of a particular project by Congress. We have certain *engineering* differences existing between that project and another distinct plan. A board is created to examine into these engineering differences and report its recommendation to the President, thus completing the full duty of such special board.

It must be kept in mind that only "the engineering differences" are to be inquired into, all other differences between the plans, if any, having been definitely resolved by Congress in favor of the plan of Dec. 1, 1927, so that the field of review on the part of the special board was specifically limited, and while the special board undoubtedly had some latitude in connection with its consideration of such engineering differences, nevertheless the function of the board was required to result in a recommendation to be finally made to the President, after which "the decision of the President upon all recommendations or question submitted to him *by such board* shall be followed in carrying out the project herein adopted." This power of decision is only on "engineering differences," not on questions of legal rights, duties or liabilities. Questions such as the obligation to provide flowage rights, or to make compensation in connection therewith, do not fall within the term "engineering differences."

The further language of the act specifically stating that "the board shall not have any power or authority in respect to such project except as hereinbefore provided" necessitates the conclusion that when the board shall have made its recommendation to the President, and the President shall have acted thereon, the full function of the board will have been fulfilled, and the board will have no further power and therefore no further reason for existence. I am advised that this is precisely the construction placed upon the act by executive authority, inasmuch as the compensation to be paid the civil member of the board was apportioned so that the final payment thereof was to be made upon action by the President on the findings of the board.

It further appears that President Coolidge received the

recommendations of the special board, considered them, and acted upon each and all of them, and that various steps have been taken by the officials in charge of the project, based upon the decisions of President Coolidge just referred to. In some instances surveys have been made; in some instances contracts have been let; in some instances bids have been advertised for.

Nowhere in the act does it appear that any latitude whatever is permitted with respect to the project covered by the act, save and except as is provided for in connection with the recommendations of the special board and the decision of the President thereunder. As pointed out heretofore, the board having acted and completed its duties and the President having made his decision upon such recommendations of such special board, and such decision having been acted upon to a greater or less extent by the officers in charge of the project, it would seem that the project covered by the act has now become fixed and definite with no power of modification or change, except as provided in the project itself, by any authority save the Congress.

The flood-control act requires the President, upon receiving the report from the special board, to decide upon the recommendations of the special board. The decisions thus made by the President are evidently intended under the act to become a part of the project authorized by the act.

* * * * * * *

In such circumstances, it has been frequently ruled by this department that final action taken by the President or head of a department is not subject to modification or review by his successor.

For the above reasons, I am of the opinion that the project set forth in House document 90, 70th Congress, First Session, is the legal project to be executed in accordance with the law, and that this project is fixed and not subject to review or change by this administration.

Compensation for Flowage Rights

In respect to your remaining inquiry as to the necessity of providing compensation for flowage rights in the Boeuf and Atchafalaya basins, I beg to advise you that there are now pending in the federal courts having proper jurisdiction various suits against the Secretary of War and others, involving the judicial determination of the precise question thus presented by you, and in accordance with a rule of long standing in this department I must respectfully decline to express any opinion on your question with respect to the purchase of flowage rights, that being one of the precise issues in the pending litigation above referred to.

Water Powers of California

A report on the water powers of California has been submitted to the Federal Power Commission by Frank E. Bonner, district engineer of the Forest Service. The growth of the state has been largely dependent on its hydraulic resources, it is pointed out, first in mining, later for irrigation and now for domestic and industrial power. In 1927 California's hydro-electric production was 22 per cent of the national total and furnished 90 per cent of the power output within the state, the figure approaching seven billion kilowatt-hours. For the past few years New York and California have been running neck and neck as the largest hydro power-producing states, but California with her vast undeveloped resources has forged steadily ahead and is now more than a billion kilowatt-hours in the lead.

Given briefly in the report is an outline of the developed and undeveloped power resources in such a way as to be useful to engineers and others wishing to gain a clear, general picture of the situation. Individual problems of generation and distribution are covered by accompanying maps, cuts, and tables without the sacrifice of either brevity or essential detail. The report has drawn favorable comment in government circles. It has resulted from studies by the Forest Service made over a period of years. The interest of this branch of the service in the matter is explained by the fact that more than nine-tenths of the undeveloped water powers lie wholly or partly within national forest areas.

Letters to the Editor

Parallel Streets vs. Boulevards

Sir—The writer was very much interested in the editorial in your issue of July 18, 1929, entitled "Parallel Streets vs. Boulevards," and agrees with you that the time has come when the boulevards have been sufficiently developed to enable us to analyze their effect not only upon traffic but upon business as well.

The effect upon business of the widening of Woodward Ave., Detroit, is not the only case in point. The writer is convinced that when roadways exceed a width of 50 ft. they furnish a real bar to pedestrian traffic and that such an interference with pedestrian traffic necessarily has an influence upon business. There is a decided difference in business conditions on the north and south sides of the widened Second Ave., Pittsburgh, Pa.

Wherever the same traffic needs can be met by the moderate widening of two parallel streets, there would seem to be a decided business advantage gained over the inordinate widening of one of the two streets.

The writer is convinced that this principle holds true of suburban roads as well as city highways. There are undoubted cases where the public authorities have built monumental, wide highways at a larger expenditure than would have been required for the building of two parallel highways of moderate width situated at distance of, perhaps, one-half mile apart and connecting the same termini.

While the traffic needs furnish the main reason for road expenditure, no intelligent road planning can ignore the effect of highways upon the development of real estate and the consequent increase in taxable valuation.

Your editorial is a very proper plea for the consideration of all of the conditions surrounding each particular case of highway location. LOUIS P. BLUM.

Pittsburgh, Pa.,
July 23, 1929.

Sanitation at Country Schools

Sir—As to the typhoid epidemic at Winston, Mo., noted in *Engineering News-Record*, July 11, pp. 43 and 73, unfortunately the control which the state Board of Health and the state Department of Education can exert over rural schools as regards sanitation is somewhat limited. Satisfactory supervision and approval of plans for school buildings by a sanitary engineer would have prevented the unsatisfactory location of the sewer system at the Winston school and the poor construction of the school well, both of which caused the recent disastrous typhoid outbreak at this school. However, under the state law this cannot be required. At present our efforts for better sanitation include annual sanitary inspections of schools by county health officers and reports to school officials concerning the sanitary defects revealed by these inspections. Also, a system of grading schools is carried out by the Department of Education in which the sanitary conditions must be approved, in accordance with the state Board of Health regulations, to receive a first-class rating. We believe these endeavors will gradually lead to better sanitary conditions in rural schools in Missouri.

It is our plan to circulate a brief report of the Winston epidemic to all the county superintendents of schools and county health officers. This, as well as your editorial on this typhoid outbreak at Winston, we believe will result in improvements.

By direction of Dr. James Stewart, State Health Commissioner. W. SCOTT JOHNSON,
City of Jefferson, Mo., Chief Public Health Engineer.
July 19, 1929.

News of the Week

Moffat Tunnel Blocked by Roof Fall

Failure of the timbering of the Moffat tunnel at a point about 3,000 ft. from the east portal on July 26 resulted in the blocking of the track by about 400 cu.yd. of material and forced the Denver & Salt Lake Railroad to route trains over the 23-mile track over the continental divide used before the completion of the tunnel. The first failure occurred about 5 a.m. and was followed by other falls at 9 a.m. and at noon. It is stated that the roof timbers had been weakened by dry rot. Repairs were started immediately, and it is expected that train service through the tunnel will be resumed in about four days.

Testimony is now being taken in Denver in regard to the suit of the Moffat Tunnel Commission, which is seeking an increase in the rental charged the railroad.

Engineering Council Appoints Committees to Aid Government

Organization for 1929 of more than a score of committees to work with Congress and the federal administration in shaping public policies involving engineering operations is announced by the American Engineering Council. Communications, flood control, safety of dams, water resources and government reorganization are among the chief problems to be studied. At a meeting of the council's administrative board to be held in Washington in October these committees will submit reports reflecting the engineering attitude toward legislation arising at the next session of Congress. Mississippi flood control is cited as one of the many situations which need clarification by the civil engineer.

D. Robert Yarnall of Philadelphia is chairman of the public affairs committee. Public questions affecting engineers generally will come before this committee.

A new committee on communications headed by Edwin F. Wendt, of Washington, will study fundamental questions raised by the Watson and Couzens bills.

Gardner S. Williams, of Ann Arbor, Mich., is chairman of a committee on flood control. Mr. Williams also heads committees on government reorganization and the safety of dams.

Chairmen of other committees of the council include:

Power—Farley Osgood, New York; reforestation—William Boss, University of Minnesota; street and highway safety—M. M. Fowler, Chicago; recent economic changes—Dean Dexter S. Kimball, Cornell University; patents—Edwin J. Prindle, New York; national hydraulic laboratory—Farley Osgood, New York; Washington-Potomac Canal—D. H. Sawyer, Washington; finance—John H. Finney, Washington.

Cunningham Dismissed From Louisiana Highway Department

The dismissal of Max Cunningham as maintenance engineer of the Louisiana State Highway Commission is announced at the state capital, Baton Rouge. This is another step in the upheaval that has taken place in the commission, resulting in the resignation of L. R. Ames, who retired as state highway engineer in June, giving as his reason Governor Long's interference with highway affairs, as outlined in *Engineering News-Record*, June 6, 1929, p. 919. Mr. Ames was brought in from North Carolina and Mr. Cunningham from Oklahoma.

Two Vehicular Tunnels Indorsed for New York City

Two tunnels to connect boroughs of New York City have been indorsed by the city's Board of Estimate and Apportionment, which made an appropriation of $5,000,000 for the preliminary work.

One of the tunnels will accommodate vehicular traffic across Manhattan under 38th St. and the East River to Queens County and will have a branch to terminate in the Greenpoint section of Brooklyn. For the preliminary surveys for this project $2,000,000 was voted.

The other tunnel will cross the Narrows from South Brooklyn to Staten Island and $3,000,000 was voted for the preliminary plans. This will also be a vehicular tunnel.

British Water Supply Shortage Causes Drastic Measures

Editorial Correspondence

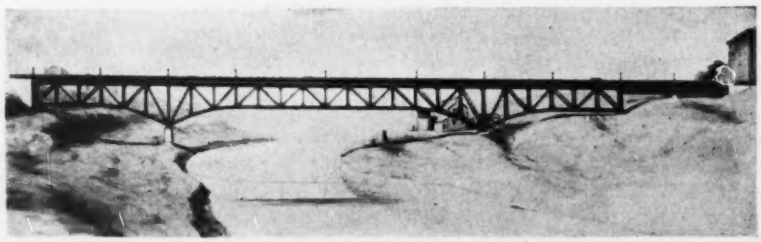
Drought in parts of England has caused water shortage in several cities. At Bradford the water in storage July 18 was enough for only six weeks' normal supply, representing one-fourth the full capacity of the reservoirs. To conserve the supply water has been shut off at night, making 3,000 night workers idle. A number of other places have shut off the water supply from 6 p.m. to 6 a.m., and in one small town water is supplied on alternate days only. Lake Thirlmere, the source of the Manchester supply, was very low when a member of the editorial staff of *Engineering News-Record* visited it on July 10.

The Ministry of Health has issued a water shortage circular urging economy in the use of water and advising chlorination (which is not widely practiced in England) in case of pollution danger due to low water and also advising householders to boil water taken from unusual sources. The Ministry of Health proposes that "water undertakings" inspect household pipes and fixtures and repair faulty ones in order to curtail waste.

Builders' Safety Code Compiled by Institute of Architects

To reduce the mortality among workers in the building trades the American Institute of Architects has compiled a "safety code for the construction industry" and will make it available for nation-wide indorsement and adoption by contractors, it is announced by Samuel R. Bishop, of New York, chairman of the institute's committee on health and safety.

ROCHESTER TO BUILD NEW BRIDGE ACROSS GENESEE RIVER



Bids will be received Aug. 14 for the construction of the new $1,000,000 Smith St. bridge across the Genesee River in Rochester, N. Y., illustrated above. This will consist of a 420-ft. central cantilever span with two 180-ft. anchor arms and two 67-ft. deck plate girder approach spans. Granite pavement will be used on the 80-ft. reinforced-concrete roadway. The new bridge will replace an old structure built in 1871, consisting of two wrought-iron trusses which were strengthened about 25 years ago by the construction of a steel truss midway between. Plans for the new bridge were prepared by Frank P. McKibben, consulting engineer. In connection with the project, Smith St. will be widened to a width of 80 ft. and several new approach streets will be opened.

Failure to Widen St. Lawrence Worries Canada

Delay in starting work on channel widening in the American section of the St. Lawrence River, caused by the failure of Congress to appropriate funds, is causing adverse comment in Canada.

Terminal works are now well under way in Prescott to accommodate the grain boats from the upper lakes as soon as they are able to use the Welland ship canal and it is feared that the big boats will not risk the channel unless the United States widens the portion where the steamboat course is in United States waters.

Bids have been opened by the Public Works Department for the Canadian section which requires the removal of nine shoals near Brockville. The bidders agree to have a channel 25 ft. deep and 450 ft. wide in that vicinity by July 1 next. The work it was expected the United States would do is in the vicinity of Alexandria Bay and consists of widening a present 350-ft. channel to about 600 ft.

When the engineers studying the deep waterways project reported on the cost of an exclusively Canadian channel from Kingston to Prescott the cost was fixed at $9,000,000. This, however, was for a channel 600 ft. wide.

Salem, Ore., to Dedicate New Municipal Airport

The municipal airport now being constructed by the city of Salem, Ore., will be dedicated by the American Legion at its annual state convention Aug. 8-10. This airport was made possible by the favorable popular vote about fourteen months ago on a $50,000 bond issue.

Tracts of level land aggregating 315 acres adjoining the city limits on the southeast were purchased and early this season work was started on the project. There will be four runways, the shortest of which will be 3,300 ft. in length and the longest a little over 4,000 ft. The runways will be 500 ft. wide. These have been graded, tile drains are now being installed, and the first hangar, 80x100 ft. will soon be constructed.

Denver Gets Permit for 79,000-Hp. Project

Issuance of a preliminary permit by the Federal Power Commission to the city and county of Denver covering a 79,000-hp. project at the Two Forks dam site on the South Platte River is believed to be the first step on the part of Denver's water commissioners to launch that city into the power business.

The Two Forks organization, according to Malcolm Lindsey, attorney for the commissioners, merely gives three years' time for exploratory work and contemplation of development possibilities. A further permit, involving water rights and dam site at Eleven Mile Canyon, will be applied for as soon as surveys now being made are completed. Eleven Mile Canyon is near Lake George, Colo., and nearer the headwaters of the Platte than Cheeseman reservoir, the present principal source of Denver's water supply.

Cheeseman Lake has a capacity of 80,000 acre-ft., which is not regarded as a sufficient impoundage to insure Denver an adequate water system ten years hence. The Two Forks and Eleven Mile projects are designed, according to the commissioners, to conserve floodwaters at sporadic intervals and add about 40,000 acre-ft. to the city's reserve. Present plans contemplate the construction of three reservoirs with six power plants, two at each location, to develop a total of 59,250 kw. Sale of this current has been urged as a means of retiring outstanding water bonds and furnishing the city and county of Denver with permanent revenue.

Denver acquired its water system in 1918 when the city purchased the Denver Union Water Company for $14,000,000. Since that time various plans to put the business on a profitable basis have been promoted.

Hydro-Electric Power Project for Washington

Permits have been issued by the Washington Hydraulics Office to the Pacific Development Company, Olympia, Wash., granting the use of 1,050 sec.-ft. of water from the Nisqually River in the vicinity of McKenna, on the boundary line between Pierce and Thurston counties, Wash., for a hydro-electric power project estimated to cost $1,500,000. Approximately 26,820 hp. is to be developed, according to Lars Langloe, president of the company, and the plant is expected to be finished in October, 1930. A 230-ft. concrete dam 4 ft. high is planned to divert the water into a 9-mile canal leading to the plant.

Engineers to Study Relief for New Jersey's Water Shortage

With six counties suffering from what virtually is a famine of drinking water, the New Jersey Water Policy Commission has announced the appointment of five engineers to make surveys and report to the 1930 legislature on New Jersey's next major water-supply development.

The engineers appointed are: Morris R. Sherrerd, consulting engineer of the Department of Public Affairs of Newark; Arthur L. Sherman, Charles Breitski, Leon Cutler and Charles Anderson. They will seek to work out a plan for a water-supply development which will give relief to the counties of Bergen, Hudson, Passaic, Essex, Union and Middlesex, where a drought has existed for several weeks.

The water shortage has made it necessary for the commission to release 50,000,000 gal. of water a day into the bed of the Passaic River from the Wanaque reservoir.

U. S. Gets Big Judgment in Lumber Sale Suit

The largest judgment ever obtained by the government in a civil action for alleged fraud in the operation of a public contract has been handed down by the Supreme Court of the District of Columbia. The judgment is against John L. Phillips, of Thomasville, Ga., $1,381,447; Frank Sullivan of Buffalo, N. Y., $947,610.73; Merchants & Manufacturers National Bank, of Newark, N. J., and Nellie Senft Chambers, executors of George M. Chambers, deceased, $26,088.94; Lottie Eitzen, executrix of Gus Eitzen, deceased; Charles Phillips, Jr., and Mitchell A. Touart, Jr., of Pensacola, Fla., $164,194.25, and Roland Perry and Lee L. Herrell, of Washington, $68,719.55.

The Fidelity & Deposit Company of Maryland, the bonding company on the contract, is held jointly and severally liable with Phillips to the extent of $500,000, the penal amount of its bond.

The court order specifies that liability in each instance save that of Fidelity & Deposit Company must bear interest from June 7, 1927. In the case of the exception the interest is to begin on March 5, 1923, the date on which the government filed the original bill of complaint.

The judgment is the result of civil action instituted by the government after Phillips and Sullivan were acquitted on charges of criminal conspiracy growing out of sales of lumber from army cantonments following the armistice.

All the defendants have appealed.

West Coast Sand, Rock and Gravel Firms Unite

Consolidation of the holdings, business and interests of a number of producing and distributing companies engaged in the sale of sand, rock and gravel, with plants throughout central and northern California, to form the Pacific Coast Aggregates, Inc., has been announced. The companies included in this merger are Acme Gravel Company, Associated Gravel Company, American River Sand & Gravel Company, American Sand Company, Bay Development Company, T. I. Butler Company, California Rock Company, Coast Rock & Gravel Company, G. & M. Gravel Company, Golden Gate Atlas Company, California Building Material Company, Piedra Rock Company, Pratt Building Material Company, Pratt Rock & Gravel Company, Rhodes-Jamieson Company, River Sand & Gravel Company, Santa Clara Gravel Company and Vulcan Rock Company.

The officers of the new company include: president, Norman B. Livermore, director, Crocker First National Bank and Pacific Gas & Electric Company, and president of the California Building Material Company; vice-president, George G. Jamieson, president, Rhodes-Jamieson Company; vice-president, F. W. Erlin, Coast Rock & Gravel Company. Headquarters of the new company will be in San Francisco.

Rehearing on Valuations Asked by California Public Services

Both the Pacific Gas & Electric Company and the Great Western Power Company have applied to the California Railroad Commission for a rehearing of its recent decisions fixing the prices to be paid by the city and county of San Francisco for the two companies' electric systems, within the city, as they existed on Feb. 11, 1924. Both companies in their petitions attacked the valuations set by the commission on various items of their properties as unjust and unfair, particularly the allowance made for severance damages; challenged the jurisdiction of the commission to conduct such proceeding; questioned the legality of the public utilities act giving the commission authority to make the valuations; and contended that the city followed an illegal procedure in coming before the commission.

Suit to Determine Validity of Pioneer Bore Patent

Alleging that the method of boring and constructing the Great Northern Railway Company's 8-mile tunnel through the Cascade Mountains was an infringement upon his patented pioneer bore method, Arthur C. Dennis and the estate of Frederick Wilson have filed suit in the United States court in Spokane, Wash., against the railway company and A. Guthrie & Company, which handled the contract.

The pioneer bore method was used in connection with the driving of the 5-mile Canadian Pacific Railway tunnel under Rogers Pass in 1914 and also in driving the Moffat tunnel in Colorado.

The issue in the present suit is not one of damages but rather is to establish validity of the Dennis patent and determine whether the Great Northern Railroad has infringed the rights involved.

New York Sued for Infringement of Dock Patent

Damages of not less than $1,500,000 nor more than $3,500,000 are sought from New York City for patent infringement in the construction of a number of piers, bulkheads and quays in various parts of the city in a suit filed in the federal court by the Dock Terminal Engineering Company, of Ohio, and a number of individual complainants. It is charged that the city infringed patent 1,089,405, issued in 1909 to William S. Ferguson, on a device for building reinforced-concrete piers and bulkheads.

The piers designated are 3, 46, 35, 6 and 34, and one at 44th St., all on the North River; the Brooklyn bridge pier and platform in Manhattan, and the piers at East 79th St., the Canarsie pier, Jamaica Bay, and Pier 23, at Atlantic Ave., Brooklyn. Other structures in which it is alleged the infringement occurred are the South Dock, Rikers Island; the quay wall and dock at Willard Parker Hospital; the Stapleton, Staten Island, dock; the quay wall pier, and the piers north to Pier 18, including Piers 12 and 13, and two docks at Barren Island; the pier at Columbia St. and Erie Basin, Brooklyn, and the new bulkhead along the Harlem River from 165th St. to 193d St.

CHICAGO DAILY NEWS BUILDING COMPLETED

Above is shown a recent view of the Daily News Building, Chicago's first major air-rights structure, which was described in *Engineering News-Record*, April 25, 1929, pp. 664-667. Dimensions are: length, 389 ft.; width, 239 ft. on the Madison Ave. side (foreground) and 270 ft. on the Washington St. side (background). A portion of the 26-story main building and both of the wings are built over railway tracks. An unusual feature is the 35x125-ft. pedestrian bridge, shown at the left, which connects the waiting room of the Chicago & Northwestern station with the main concourse of the Daily News Building, and thence with the street. Roof, siding and window-frames of this bridge were made of a chrome nickel iron known as Allegheny metal, the highly polished finish of which is resistant to the corrosive action of the elements. Holabird & Root were architects for the building. Hegeman & Harris were the general contractors.

Washington Adopts New Rules for Razing Buildings

An accident on Oct. 25, 1928, in which two workmen were killed and two injured in the cave-in of a wall around an excavation at Fourteenth and K Sts., Washington, D. C., during construction of a building, has resulted in the adoption of an amendment to the building regulations by the district Commissioners.

By its terms, the owner as well as the contractor in charge of razing a building must provide adequate safeguards to protect the workmen. For buildings more than three stories high a special inspector must be appointed by the owner, whose appointment must be approved by the inspector of buildings and whose duties shall be to see that the razing is carried on in full accord with the regulations.

Necessary safeguards shall consist of such props, posts, braces, stages, platforms and scaffolding as may be necessary to provide sufficient strength and rigidity to the portions of the building being taken down or removed to insure the safety of the workmen employed.

"Razing shall begin at the top of the structure and proceed downward. No wall, beam, column, or the like, supporting any load shall be disturbed or weakened until such load is entirely removed. All masonry walls shall be removed, unit by unit, and in a manner approved by the inspector of buildings. All loosened material and debris shall be removed from time to time so as not to accumulate in such quantity or such weight as may overload any floor, platform or scaffold. Plain or reinforced-concrete structures shall be razed in such manner as is approved by the inspector of buildings.

"No structure or portion thereof being demolished or declared to be dangerous under the provisions or section 1, part 1, of the building regulations shall be thrown, pulled or blasted unless special approval is given by the inspector of buildings upon application, in writing, by the owner or his agent to do so."

Brief News

OPENING of the Tacony-Palmyra bridge, spanning the Delaware River, will be formally made on Aug. 14. This bridge will accommodate those who wish to reach seaside points without going through congested districts of Philadelphia and Camden.

THE CITY OF QUEBEC is given until January, 1930, to prepare plans for the construction of a filter for its aqueduct water, under orders of the provincial health director. The work must be started by May 1, 1930, and the filter must be finished by May 1, 1931. It will cost the city approximately one million dollars.

CONSTRUCTION PLANS for 1,300 miles of new railway line have been completed by the Austrian government. This work will extend over seven years. Electrification of the railway line from Innsbruck, in the Austrian Tyrol, to the Italian frontier was finished last year.

ZANESVILLE, OHIO, will vote on Aug. 27 on the adoption of the city manager form of government. If the vote is favorable, Zanesville will be the twentieth Ohio city and the 400th in the United States to adopt the plan.

APPLICATION has been made to the Interstate Commerce Commission by the Great Northern Railway for permission to build a 32-mile extension to its Richey, Mont., line. This branch would extend westerly from Richey through parts of Dawson and McCone counties lying about 25 miles south of the main line of the Great Northern and would tap a rich agricultural region.

RECENT IMPROVEMENTS in the construction of steel houses in Germany have so increased the demand that the works are still far behind in filling orders. The formation of a company to export such dwellings is planned when production facilities reach a point justifying this action.

THE CANADIAN NATIONAL RAILWAYS has taken over the Quebec, Montreal & Southern Railway, which will be operated as part of the National system. The lines cover a distance of 191 miles, from St. Lambert to Sorel, Nicolet and Fortierville, and from Bellevue Junction to St. Hyacinthe and Noyan.

A MEASURE under the terms of which a state board of examiners would be created for general contractors doing business in Georgia has been introduced in the Georgia State Legislature.

A METAL DAM is to be constructed as an experiment near Minden/Ruhr, Germany, in connection with a hydroelectric power plant generating 8,000 hp. It will be made partly of steel and partly of iron, manufactured under Armco license in Germany.

ABANDONMENT by the Wheeling & Lake Erie Railroad of its present passenger station in Cleveland and use of the new station under construction by the Cleveland Union Terminals Company have been authorized by the Interstate Commerce Commission. The move was fought by minority stockholders of the Wheeling road on the ground that the price, $1,600,000, to be paid by the Terminals company for the old station was too low.

WASHINGTON NOTES

By PAUL WOOTON
Washington Correspondent

Oppose Diversions From Great Lakes—Army Engineers May Be Affected by Economy Move

DECLARING their opposition to the plan of the Sanitary District of Chicago for improving the Illinois River as a waterway, a delegation of the Attorneys General of the six states bordering on the Great Lakes called upon President Hoover July 25 to urge him not to approve any plan for the development of the Lakes-to-the-Gulf waterway in contravention of the decision of the U. S. Supreme Court in the Chicago drainage case. In a memorial presented to the President the delegation represented that any diversion of water from the Great Lakes in excess of 1,000 sec.-ft. would impose a wholly unnecessary burden upon lakeborne commerce, in that such excess is not required to permit utilization of a 9-ft. channel from Lake Michigan to the Mississippi River.

Reference was made to the several plans prepared by the War Department for the improvement of the Illinois River, and it was contended that the most costly of these would be an insignificant burden compared with the economic value to the country of the diminished diversion required by it. If diversion is authorized at all, navigation should be the object sought, the Attorneys General represented, contending that the interest of the Sanitary District is not primarily in navigation, as its plan contemplates continued pollution of the Chicago River, thus requiring diversions for immunization larger than are needed for navigation. Profit from the power developed was declared to be the inspiration of the Sanitary District's plan. The records of the litigated cases disclose, it was stated, that the proposed waterway of the State of Illinois is expected to yield an annual profit of $2,000,000 from water power, while the Chicago Sanitary District would make an annual profit of $1,000,000 from the use of diverted water for power purposes, when the water could be used to greater advantage at the eastern end of the lakes after all the purposes of navigation have been served.

Any consideration of the problem, it was submitted, thus must take into account the improper uses which have been made by the Sanitary District of the diverted water for sewerage and power purposes, while authorization given to the Sanitary District or to the State of Illinois to divert water into the Mississippi River would establish a precedent for other and increasing diversions, with peril to Great Lakes navigation. Consideration also should be given in the inquiry directed by President Hoover, it was stated, to the fact that the interest of the Dominion of Canada, as a user of the Great Lakes waterway, lies with the complaining states.

Niagara Treaty Delay

In denying that Chicago interests alone are responsible for the delay in Senate ratification of the Niagara remedial works treaty, Senator Borah in a recent statement said that the foreign relations committee has agreed that it will consider no controversial subjects until Congress meets in its regular session in December. The Idaho Senator declared that the approval of a treaty with Canada affecting the beauty of the falls is a serious matter and should not be rushed into lightly. It is not only Chicago that is opposing prompt ratification, he brought out, but other communities and sections along the upper lakes as well. Interests from Michigan, Minnesota and Wisconsin have requested the committee to grant them a hearing before it approves the treaty, Senator Borah said. When reminded that the engineers' report brought out that only a small amount if any additional water would be drawn from the basins of the upper lakes by reason of the construction of the submerged weirs, he expressed the opinion that this technical report is far from conclusive. The impression evidently exists that if the main object of the project is not to draw additional water from the upper lakes, the power companies would not be interested.

It seems probable, however, that the main reason for the delay is the determination of some of the lake state interests not to lose what may prove to be a good trading point with Canada. Under this policy, no settlement would be made with Canada affecting the boundary waterways until the whole subject of Great Lakes outlets and diversions is taken up. This would include both the St. Lawrence waterway project and the Illinois canal.

Bond Premium Disallowed on Partial Payment

The recent decision of the Comptroller General to disallow a claim for the premium on a performance bond in partial payments on government construction work is not unusual and does not create a precedent, in the opinion of officials of the supervising architect's office. These premiums have never been included in the estimates for progress payments, they point out. If the government should specifically include premiums on bonds in its progress payments, it would have to single out all other units for individual consideration in making the payments, it is held.

The decision was handed down on the application of the Consolidated Engineering Company, of Baltimore, which

is putting up the new Department of Commerce building under a contract price of $13,567,000. The company contended that the payment of a premium of $237,422.50 on the $7,000,000 bond required tends to impair the financing of the undertaking by restricting the working capital. The Comptroller General rules, however, that "the giving of bond and payment by the contractor of the premium thereon is neither delivery of material at the site of the work nor progression of the work justifying partial payment therefor."

Press accounts when the decision was issued misinterpreted it as meaning that contractors would receive no reimbursement for expenditures made on bond premiums. While the wording of the decision in the section that states "there is no legal obligation under the contract, no authority of law for the payment by the United States of the premium," explains this interpretation, no such meaning is intended, it is stated by Treasury officials and members of the general accounting staff.

Examining Government Lands

Following the commitment of Secretary Wilbur to a policy favoring the transfer of all unreserved federal lands to the states, the Interior Department has been compiling data to show the nature of the land involved. The Public Land Office is to furnish a tabulation of the total and state areas involved, with a summary of the general nature of these origins. Other bureaus will report as to the parts possessing oil, mineral or important water-power possibilities and the approximate extent of tillable and grazing land. A statement as to the reclamation projects which have been proposed in recent years also is in preparation, with special emphasis on those which are being advocated actively at the present time.

Government Engineering Consolidation

In discussing the President's program for cutting down army expenditures, Secretary of War Good has stated that only general rules of procedure have been worked out to guide the committee of generals who will outline a retrenchment plan consistent with national safety. The committee may take cognizance of the proposals that have been made for the consolidation of governmental activities by the establishment of a department of public works to supervise all the engineering functions of the government, he said. Since the committee will have no authority outside of the War Department, however, it cannot recommend such consolidations, but can only consider them from the standpoint of the effect they would have on the retrenchment program if they should be authorized by Congress.

The matter of merging the engineering activities of the government has long been considered in Congress and a bill along this line received careful attention from the House committee on expenditures in executive departments during the last regular session. As President Hoover on former occasions has expressed sympathy for a general reorganization of the various departments, it is believed that action will be taken by Congress on the measure when it convenes in December. It is known, however, that high officials of the War Department do not look with favor on the proposals that the Corps of Engineers be shorn of any of its present authority.

It has been suggested that, as a part of the program for reducing the War Department's budget, saving could be effected in the coast defense service by a greater use of railway gun mounts. Secretary Good does not believe that this suggestion is practicable. Sections now defended by permanent gun mounts cannot be convinced that they would receive the same degree of protection from the use of mobilized railway units, he pointed out. Many of the bridges leading to important coastal cities are incapable of withstanding the stress of the railway gun carriages, he added. In his opinion, it would cost more to bring these structures and other parts of the track systems up to the necessary standard than could be saved by doing away with the fixed locations.

Jadwin's Successor Not Yet Appointed

The name of the successor to Major Gen. Edgar Jadwin, Chief of Engineers, will not be announced before Aug. 7, when General Jadwin retires from active service, it has been stated by the Secretary of War. Secretary Good, in making this announcement, said that no name has been agreed upon. The delay in making the appointment is not unusual, he declared, and does not imply that precedent will be set aside by the naming of someone who will have to be jumped up several places in rank.

Engineering Societies

CALENDAR

ANNUAL MEETINGS

AMERICAN ASSOCIATION OF ENGINEERS, Chicago; annual meeting, Mexico City, Aug. 26-28.

AMERICAN WELDING SOCIETY, New York; fall meeting, Cleveland, Ohio, Sept. 9-13.

NEW ENGLAND WATER WORKS ASSOCIATION, Boston; annual convention, Portland, Me., Sept. 16-18.

AMERICAN SOCIETY OF CIVIL ENGINEERS, New York; fall meeting, Boston, Mass., Oct. 9-11.

* * *

THE NEW YORK SEWAGE WORKS ASSOCIATION held its first meeting July 27 in Rochester. About 50 sanitary engineers attended. This newly organized association plans to hold four meetings a year. The next meeting will be in Schenectady.

Obituary

THOMAS MCKENZIE, civil engineer and superintendent of the Westerly (R. I.) water-works, died of a heart attack on July 25. He was a native of Providence and took charge of the town's water system when it was taken over from private ownership in 1897.

THOMAS MCLAUGHLIN, of Ottawa, Canada, died on July 22 in his 72d year. Mr. McLaughlin had been in the contracting business nearly 40 years and constructed many of the most important public works of Ottawa. He constructed a large part of the water-works system of the city, as well as bridges, power houses and sewerage systems.

FRANK DENNIS STANLEY, formerly an active civil engineer in the East, died recently in Waycross, Ga. He was 75 years of age, and retired from active business life about four years ago, making his home since in Florida and Georgia. Mr. Stanley was prominently connected with surveys of the Northern Pacific Railroad many years ago, and also conducted surveys for the Ann Arbor Railroad.

RALPH E. MILLER, 51 years old, bridge engineer for the St. Louis-San Francisco Railway, died in St. Louis, Mo., on July 23. Mr. Miller was graduated from Washington and Jefferson University, Washington, Pa., in 1899 and then went to the Pennsylvania Railroad as a rodman. He was with that road until 1900, when he took a position with the Ritter-Conley Steel Company in Pittsburgh. Later he was employed by the American Bridge Company until 1907, when he succeeded S. E. Rice as assistant bridge engineer for the Frisco.

GEORGE A. MITCHELL, who for more than half a century had been engaged in bridge construction for Canadian railways, died on July 25 at Toronto. He was born in Waterloo, Que., in 1835 and began his career with the Grand Trunk in 1870. On the amalgamation of the Grand Trunk with the Canadian Northern in 1923 he was made supervising engineer of the combined lines. Mr. Mitchell retired in 1925, but one year later he was recalled to supervise the construction of the viaduct at the new terminal station in Toronto.

HARRY C. FRANKENFIELD, flood expert of the U. S. Weather Bureau, was hit by an automobile while crossing a Washington street and died on July 29 as a result of his injuries. Dr. Frankenfield, who was 67 years old, had been connected with the Weather Bureau in Washington since 1898. He had specialized in and was considered a leading expert on the bureau's river and flood work. He was in charge of the Weather Bureau office in Chicago from 1887 to 1894, and in St. Louis from that date until he went to Washington. He was a member of the Washington Academy of Sciences and the Philosophical Society of Washington, and was a fellow of the American Meteorological Society.

Construction Equipment and Materials

U. S. Preparing Highway Exhibit for Pan-American Congress

At the second Pan-American Congress of Highways, to be held in Rio de Janeiro, Brazil, Aug. 16 to 31, the U. S. Bureau of Public Roads will exhibit a series of six display booths, picturing road development from 1904 to the present time, telling the story of progress in highway transportation, the types of vehicles using the roads and the number of motor vehicles in existence at different periods. At the same time the bureau will exhibit three new motion picture films. The first of these depicts the surfacing of roads with gravel or sand clay or top soil, with the use of labor-saving machinery, including power shovels, dragline excavators, elevating graders and bladers. The second film shows the details of a higher type of road, in which bituminous material is used to provide a wear-resisting surface and to eliminate dust. The ultimate development of the highway for heavy traffic is shown in the third film, showing a modern concrete paver producing a 20-ft. concrete pavement at the rate of 1,200 ft. a day. All details of the job are shown.

Lumbermen to Mark Products

The use of a trademark guarantee by a whole industry rather than by individual firms has been initiated in the "tree-mark" of the National Association of Lumber Manufacturers. While trade associations previously have gone into group advertising, this is apparently the first effort to take the next logical step, a group certification of inspected products. About 80 mills with an annual output of approximately 6,419,000 ft. b.m. have entered into contracts with the association whereby the mill inspectors will use the tree-mark on lumber which complies with specifications. Regional agents of the association will check each mill at least once a month to see that their rules are properly followed. In case the buyer is dissatisfied, he may lodge complaint directly with the association, rather than fight out his case with the local mill.

The tree-mark signifies that the lumber on which it appears is guaranteed by the association to be American standard lumber, correctly graded. The movement so to identify lumber has been developed in co-operation with the U. S. Department of Commerce.

MINING SHOVEL USED IN SUBWAY EXCAVATION

While most subway construction in New York City is done in the open, conditions sometimes make it necessary to utilize tunneling methods. Such is the case in a section of the Brooklyn subway which has been let to the Mid-eastern Contracting Corporation, New York City. This job consists of 7,800 ft. of 18-ft. tunnel through solid rock. Successful use has been made of a Thew type S electric mining shovel, illustrated above, which is equipped with a ¾-yd. dipper of special design. Three electric motors are provided for hoisting, crowding and swinging, and also to propel the machine through its caterpillar mounting. The shovel weighs approximately 13 tons and can swing in a complete circle within the 18-ft. tunnel. Muck is removed by 2½-yd. battleship cars on narrow-gage track, drawn by 6-ton Whitcomb storage battery locomotives to shafts for hoisting.

New Developments

Roll-Back Principle Used in All-Steel Truck Body

Interchangeable truck bodies dumping by means of a mechanical power hoist are now being produced by the Galion Allsteel Body Company, Galion, Ohio, for use on all 1-ton and 1½-ton motor trucks. These bodies have a capacity of 1 cu.yd., and will carry up

MECHANISM OF ROLL-BACK TRUCK BODY

to 2 cu.yd. by means of auxiliary sideboards. Power from the truck transmission is utilized through a 213 to 1 gear reduction containing steel cast gears with 3-in. faces running in oil. The lift is applied at the front end of the body. Use of the roll-back dumping mechanism makes it unnecessary to cut off the rear end of the truck frame.

Capstan With Two Types of Motive Power

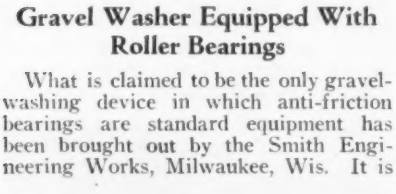
For moving freight cars and barges in construction and industrial plants, the Lidgerwood Manufacturing Company, Elizabeth, N. J., is marketing a new vertical capstan known as the Tugmore. Compactness has been emphasized in the design, the space requirements being reduced to 25x34 in. The Tugmore is available, equipped with 5- or 7½-hp. a.c. or d.c. electric motors or with a 6- to 8-hp. twin-cylinder air-cooled motor using gasoline or kerosene for fuel. The latter is illustrated. As capstans are frequently installed in exposed locations, the adaptation of the

TUGMORE HOIST POWERED BY INTERNAL-COMBUSTION MOTOR

air-cooled motor to drive the capstan is important, as the freezing hazard is avoided. Three types of anti-friction bearings, running in oil, are used. Both electric and gasoline types are of weather-tight construction.

Gravel Washer Equipped With Roller Bearings

What is claimed to be the only gravel-washing device in which anti-friction bearings are standard equipment has been brought out by the Smith Engineering Works, Milwaukee, Wis. It is



ROLLER BEARING-EQUIPPED GRAVEL WASHER

known as the Telsmith-Hercules gravel washer and is equipped throughout with Timken tapered roller bearings, resulting in a large decrease in the power consumption. The new washer is of all-metal construction with the usual Telsmith tandem sand and pea gravel jacket, the ball mill scrubber which employs the coarse rock as a grinding agency to reduce the clay balls to a paste, and, in addition, scrubber chains which greatly augment the ball mill action. Increased rigidity of the screen barrel has been secured by the use of segmental hoops. Screen sections, jacket or hoops are removable without drilling or other machine work.

New Publications

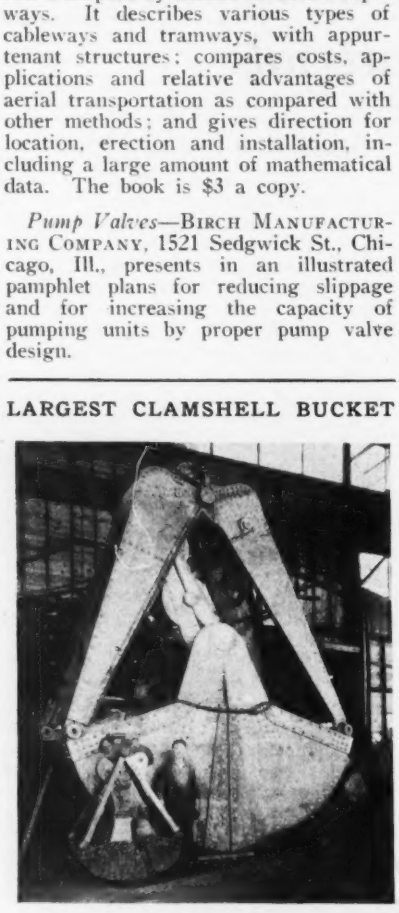
Tunneling Machine — TUNNEL & MINE MACHINERY COMPANY, 112 South Sixteenth St., Philadelphia, Pa., describes the Sheen tunneler in a 12-p. illustrated booklet. This machine consists of a cylindrical shield provided with a boring head fitted with movable bits or rooters. Excavated earth is swept into a hopper by arms and passed to a conveyor or to cars. The machine is used in conjunction with hexagonal interlocking concrete blocks which form the permanent lining of the tunnel.

Mixers — KNICKERBOCKER COMPANY, Jackson, Mich., has published a new catalog 29 describing Knickerbocker concrete, mortar, plaster and mastic mixers and also contractors' saw rigs.

Material Handling — WILLIAMSPORT WIRE ROPE COMPANY, Chicago, Ill., has published a 150-p. clothbound book, "Cutting Material Handling Costs," by C. M. Ballard, Assoc. M.A.S.M.E., edited by D. C. Sherman, M.A.S.M.E. Many halftones, line cuts and diagrams are included. The book, according to the company, was written to supply a need for a text book on the subject of material transport by means of aerial ropeways. It describes various types of cableways and tramways, with appurtenant structures; compares costs, applications and relative advantages of aerial transportation as compared with other methods; and gives direction for location, erection and installation, including a large amount of mathematical data. The book is $3 a copy.

Pump Valves—BIRCH MANUFACTURING COMPANY, 1521 Sedgwick St., Chicago, Ill., presents in an illustrated pamphlet plans for reducing slippage and for increasing the capacity of pumping units by proper pump valve design.

LARGEST CLAMSHELL BUCKET



What is claimed to be the largest clamshell bucket in the world, with a capacity of 16 1-2 cu. yd., has just been shipped by the G. H. Williams Company, of Erie, Pa., to the Donner Steel Company at Buffalo, N. Y. It is shown in the illustration as compared with the standard ¾-cu.yd. bucket built by the same company. The large bucket measures 18 ft. 9 in. in height and has a spread of 19 ft. In spite of its large capacity, it weighs only 28,000 lb.

Business Notes

WEYERHAEUSER FOREST PRODUCTS, St. Paul, Minn., has developed a new type of package for use on Four-Square trademarked lumber. The original fiber end-caps were attached by means of metal staples driven into the top and bottom boards in each package. As these were occasionally broken off by careless removal of the cap, the staples have been dispensed with, and the cap is held in position by two strips of gummed cambric attached by means of a special adhesive.

FOOTE COMPANY, INC., Nunda, N. Y., has appointed direct factory representatives as follows: Standard Machinery & Equipment Company, Spartanburg, for North and South Carolina; R. S. Armstrong & Brother Company, Atlanta, for Georgia; Southern States Equipment Company, New Orleans, for Louisiana; Burton Franklin, Chattanooga, for Tennessee; C. H. Jones Company, Salt Lake City, for Utah and southern Idaho; H. W. Moore Equipment Company, Denver, for Colorado and eastern Wyoming; Clyde Equipment Company, Portland, for Washington, Oregon and northern Idaho.

NATIONAL LUMBER MANUFACTURERS ASSOCIATION, Washington, D. C., has appointed H. L. Bravo its contact agent with the railroads. Mr. Bravo will make an extensive survey of the railway situation and will then devote his time to bringing to the attention of railway executives the advantages of timber construction.

OHIO LOCOMOTIVE CRANE COMPANY, Bucyrus, Ohio, has placed its Detroit and Chicago offices in charge of Benjamin Dixon, formerly sales manager of the Industrial Works, of Bay City, Mich. His headquarters will be at Detroit.

HERCULES MOTORS CORPORATION, Canton, Ohio, has acquired a tract of 3½ acres adjoining its present plant and has started construction of a new building which will add 68,000 sq.ft. of floor space to its present facilities. Plans for the expansion program call for an expenditure of approximately $500,000, enlarging plant capacity more than 50 per cent.

GENERAL ELECTRIC COMPANY, Schenectady, N. Y., has transferred Charles E. Eveleth, vice-president, to its engineering department. Mr. Eveleth was formerly engaged in the management of the manufacturing department.

CHICAGO PUMP COMPANY, Chicago, Ill., is now represented in Portland, Ore., by D. R. Munro.

AMERICAN ROLLING MILL COMPANY, Middletown, Ohio, is now rolling pure iron sheets on its new continuous mills to fill an order from the Pennsylvania Railroad for 1,000 all-metal boxcars.

AMERICAN HOIST & DERRICK COMPANY, St. Paul, Minn., has moved its Western office from San Francisco to Emeryville, Oakland, Calif. Boyd Nixon continues in charge.

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis., announces the following additions to its sales and service staffs: M. G. Hennessey Machinery Company, St. Louis, Mo.; Ohio Equipment Sales Company, Bedford, Ohio; and Thomas J. Crowe, Albuquerque, N. M.

HUGHES-KEENAN COMPANY, Mansfield, Ohio, announces the appointment of the Howard-Cooper Corporation, Portland, Ore., with branches at Boise, Idaho, Seattle, Wash., and Spokane, Wash., as its distributor for Iron Mules on McCormick-Deering tractors in the Northwest territory, consisting of Washington, Oregon and part of Idaho.

The Business Side of Construction

July Contracts Down From June, but Above Year Ago

Engineering construction contracts, though totaling a little less than those of June, exceed $300,000,000—below which no month has gone this year. The actual figure is $306,104,000, which is 7 per cent under the month before and 19 per cent above July, 1928. The maximum month this year was May; last year March, with May second.

Gains over July, 1928, were general, except for water-works and commercial buildings, and for the Middle Atlantic states. The gain is in public work (up 59 per cent), with private work the same as a year ago. Road contracts, though $10,000,000 under the June value, are $20,000,000 over those of July, 1928. At the end of April street and road lettings were 58 per cent under the year before. They have since been making up the lag: 31 per cent under at the end of May, 23 June, and now 15.

The first seven months are 25 per cent ahead. The gain is principally in private structures, although industrial construction continues at a record-breaking rate. Despite declines in water-works, sewers, public bridges and streets and roads, the public works total is 5 per cent better than a year ago, due to active building and federal government work.

For the first seven months private construction amounted to 38 per cent of new capital issues of September-March, compared with 48 per cent in the corresponding period of 1928. Lower public bond sales this year are reflected in the fact that public work has amounted to 68 per cent of municipal financing, compared with 57 per cent last year.

Materials Output Smaller, With Few Price Changes

Prices generally are a little easier than they were a month ago, just as the volume of contracts is a little lighter. Production of lumber, brick and terra cotta is well under that of a year ago, and cement, though still below last year, has been catching up. Cement shipments a month ago were 7 per cent below; for the half-year they were 5 per cent. Production is 2.5 per cent below that of the first half of 1928. Dealers are buying heavily for stocks. Dealer demand usually reaches peak in the second quarter, but this year it is in the middle of the third. Indication of a turn for the better is the fact that there has been less price cutting recently than in the earlier months. The only price change was a reduction of 10c. ($2.04) f.o.b. Cleveland. No price changes are foreseen, and a larger demand is looked for this month. Passing the 8c. tariff would further insure no declines.

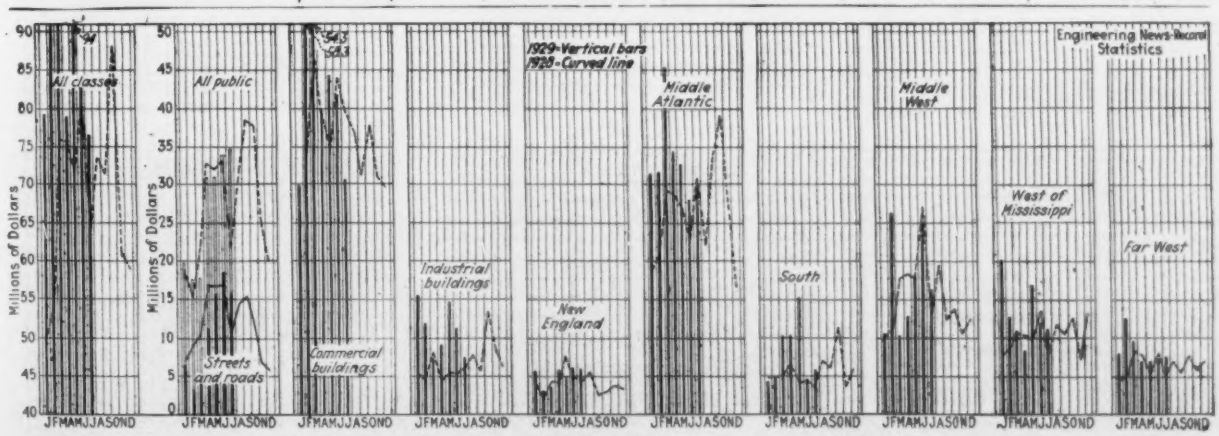
The steel market also is apparently reacting to the decline in contract letting. July figures are expected to show a drop in Pittsburgh shipments of all products except plates, which are in strong demand for pipe lines, railways and ships. Consumption of automobile steels has fallen 30 per cent under the May peak, but total ingot production shows little change. Increasing cement movement is matched by increased buying of reinforcing bars. Orders for fabricated steel have dropped slightly. Prices of the principal products are the same as in May.

The lumber situation—which will be outlined here next week—may briefly be said to be weak. At 3,283 mills in nine weeks ended July 13 the gross declines from operations in the same period of 1928 were 3 per cent for production, 9 per cent for shipments, 4 per cent for stocks and 10 per cent for orders. Prices have been held by fitting production to orders.

The brick situation is not favorable to producers, as there is a large surplus at the principal consuming centers. New York is a case in point, further aggravated by a steady inflow of foreign brick. The fact that prices have not dropped since June 6 (down $1.50) is indicative of lack of interest and not of demand maintaining price. Many plants have shut down this year, and this may influence the Senate commit-

VALUE OF CONTRACTS BY SECTIONS IN THE UNITED STATES AND TOTAL FOR CANADA, JULY, 1929
Thousands of Dollars (000 omitted)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States July, 1929	United States Year to Date 1929	United States Year to Date 1928	Canada July, 1929
Water-works	$15	$952	$134	$459	$530	$202	$2,292	$25,851	$33,770	$1,229
Sewers	268	2,109	259	5,089	222	385	8,332	53,343	56,269	306
Bridges	279	4,467	1,153	2,085	3,043	965	11,992	82,280	55,639	635
Excavations, etc	138	207	113		65	15	538	18,780	16,365	116
Streets and roads	1,305	18,089	8,490	12,264	16,460	6,868	63,476	320,342	375,226	3,860
Industrial buildings	4,267	12,145	2,130	6,295	3,002	1,160	28,999	339,775	170,303	9,800
Commercial buildings	17,302	56,953	5,381	24,625	7,837	10,891	122,989	1,270,009	1,126,690	9,215
Federal government	102	4,488	5,736	2,316	1,518	4,295	18,455	69,493	28,289	
Unclassified	459	19,738	193	11,424	12,316	4,901	49,031	366,156	164,092	3,151
July, 1929*	24,135	119,148	23,589	64,557	44,993	29,682	306,104			28,312
June, 1929*	24,144	111,274	18,409	99,034	47,988	29,316	330,165			22,024
July, 1928*	17,031	123,358	13,007	51,827	30,782	20,110	256,115			15,008
Year to date, 1929	150,897	994,473	240,582	503,407	407,070	249,600		2,546,029		122,610
Year to date, 1928	138,818	766,994	140,301	499,889	296,039	188,010			2,030,051	91,555



CONTRACTS AWARDED—AVERAGE WEEK PER MONTH—TOTAL U. S. BY CLASSES—ALL CLASSES BY SECTIONS

tee in retaining the $1.25 tariff in the House bill. During July dealers reduced prices $1 (to $14) in Baltimore and 25c. in Boston ($15). Detroit raised the price 50c. ($15.50).

Building Labor Demand Better

Common labor demand is livelier, according to reports from Cincinnati, Minneapolis and Denver. Skilled building trades mechanics find work easily, except in Chicago, Philadelphia and Detroit. In Chicago and Philadelphia construction is low; Detroit is slow in all trades, manufacturing as well as building. Important labor agreements were reached in five cities: Pittsburgh, Cincinnati, Chicago, St. Louis and South Bend. Some of these included the five-day week.

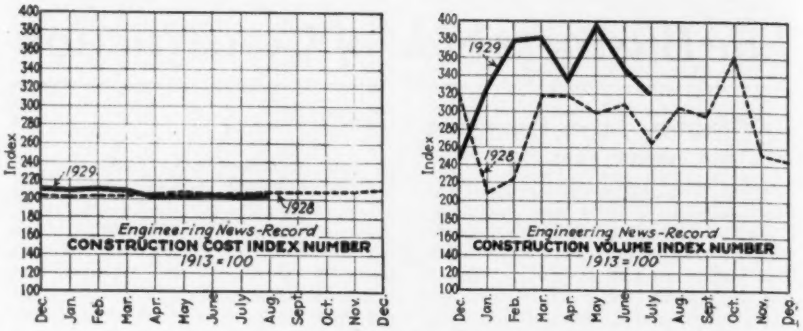
New York—Meeting of the arbitration board adjourned to Aug. 15. All strikes and lockouts suspended, pending arbitration of the questions at issue. Employers have refused to proceed except under provision of the state arbitration law. The unions threaten to order mechanics from jobs of lighting fixture contractors (members of the Building Trades Employers' Association) who are said to employ non-union men.

Buffalo—Hoisting engineers walked out following refusal of employers to hire union mechanics in operation of pumps and concrete machinery. Other crafts acted in sympathy.

Poughkeepsie—Building laborers on strike July 1, demanding increase 12½c. (87½c.) and union recognition.

Boston—Ironworkers strike in protest against setting steel sash by carpenters. Similar dispute recently started over the setting bucks for steel-frame doors. Plasters receive $1.62½ per hour and a five-day week Aug. 1.

Newark—Painters threaten strike.



ENGINEERING NEWS-RECORD CONSTRUCTION COST AND VOLUME INDEX NUMBERS

Philadelphia—Working below scale reported in many trades due to acute unemployment. Elevator erectors and hoisting engineers demand the five-day week. Many construction workers leaving Philadelphia. Jurisdictional dispute between marble setters and plasterers.

Pittsburgh—Seventeen building crafts receive five-day week without increase. Five trades still on 5½-day week are hoisting engineers, ironworkers and roofers.

Baltimore—Carpenters and elevator constructors strike over installation of elevator doors; question being arbitrated. Bricklayers increased 12½c. per hour ($1.75) Aug. 1.

Washington — Union ironworkers strike against hiring non-union plumbers on government building additions.

Chicago—Plasterers granted 7½c. increase ($1.70) Oct. 1. Union leaders seek to have rise put in effect Aug. 15. Summer construction lowest in four years. Large excess common laborers.

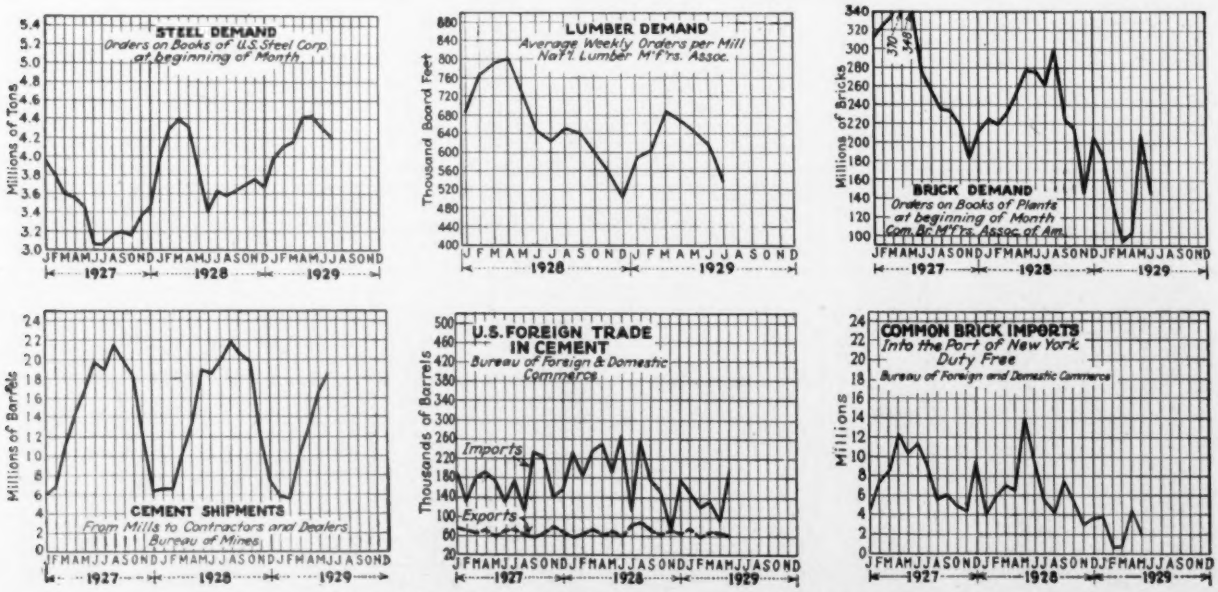
Cincinnati—Wage increases of 2½c. ($1.40) granted ten building trades, from July 1, 1929, to July 31, 1930, with conditional award of five-day from July 23, 1930. Of 106,353 regular full-time workers only 5.9 per cent are idle.

St. Louis—St. Clair County Board of Supervisors granted road laborers flat rate of 75c. per hour. Workers charged

Construction Cost and Volume Index Numbers

E. N.-R. Cost		E. N.-R. Volume*	
August, 1929	**205.91**	**July, 1929**	**320**
July, 1929	204.77	June, 1929	347
August, 1928	207.29	July, 1928	266
Peak June, 1920	273.80	1928 (average)	287
1928 (average)	206.78	1927 (average)	263
1913 (average)	100.00		
1928		**1928**	
January	203.90	January	208
February	204.65	February	225
March	204.65	March	318
April	206.40	April	316
May	207.00	May	299
June	206.15	June	308
July	206.65	July	266
August	207.29	August	306
September	207.29	September	296
October	207.71	October	363
November	209.46	November	251
December	210.16	December	244
1929		**1929**	
January	209.40	January	325
February	210.40	February	378
March	207.78	March	382
April	203.40	April	332
May	205.15	May	395
June	205.65	June	347
July	204.77	July	320

*Corrected for price change since 1913.


STEEL DEMAND
Orders on Books of U.S. Steel Corp. at beginning of Month
Millions of Tons
LUMBER DEMAND
Average Weekly Orders per Mill
Nat'l. Lumber M'f'rs. Assoc.
Thousand Board Feet
BRICK DEMAND
Orders on Books of Plants at beginning of Month
Com. Br. M'f'rs. Assoc. of Am.
Millions of Bricks
330
346
CEMENT SHIPMENTS
From Mills to Contractors and Dealers
Bureau of Mines
Millions of Barrels
U.S. FOREIGN TRADE IN CEMENT
Bureau of Foreign & Domestic Commerce
Imports
Exports
Thousands of Barrels
COMMON BRICK IMPORTS
Into the Port of New York
Duty Free
Bureau of Foreign and Domestic Commerce
Millions
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1927 1928 1929

DEMAND FOR BASIC CONSTRUCTION MATERIALS—IMPORTS

CURRENT BUILDING AND CONSTRUCTION TRADES WAGE RATES PER HOUR

Advances since last month are indicated by **heavy type**; declines by *italics*

Cities	Bricklayers	Carpenters	Hoisting Engineers	Hod Carriers	Pile Drivers	Structural Iron Workers	Common Labor*
Atlanta	$1.25@1.40	$0.60@.70	$0.60@1.00	$0.50	.....	$0.75@1.25	$0.25@.35
Baltimore	**1.75**	1.00@1.10	1.00@1.37½	1.00	$0.65	1.00@1.25	.35
Birmingham	1.50	1.00	1.25	.50	.....	1.75	**.20@.35**
Boston	1.50	1.37½	1.37½	.85	1.27½	1.37½	.45@.80
Cincinnati	1.62½	**1.40**	**1.40**	**1.00**	**1.40**	**1.40**	.40@.60
Chicago	1.62½	1.56¼	1.56¼	.90	1.56¼	1.62½	82½@.90
Cleveland	1.62½	1.37½	1.37½	.87½	1.10	1.50	.40@.87½
Dallas	1.67½	1.12½	1.25	.50 @ .75	1.25	1.25	.35 @.50
Denver	1.50@1.62½	1.25	1.25@1.37½	.87½@1.00	.....	1.25	.37½@.62½
Detroit	1.56¼	1.00@1.25	1.00@1.10	.90	1.00@1.10	1.00@1.25	.37½@.60
Kansas City	1.50	1.25	1.25	.90	1.25	1.25	.30@.75
Los Angeles	1.25	1.00	1.00	1.12½	.87½	1.00	.50½
Minneapolis	1.25@1.37½	.87½@.95	.87½	.75	.....	1.00	.40@.60
Montreal	1.25	.80	.75	.40	.....	1.00	.30@.35
New Orleans	1.50	.90	1.25	.75	.80@1.00	1.25	.30@.40
New York	1.87½	1.50	1.75	1.12½	1.00@1.12½	1.75	.90½
Philadelphia	1.62½	1.12½@1.25	1.02½	.70@1.12½	1.00	1.37½@1.50	.45@.50
Pittsburgh	1.70	1.50	1.43¾@1.56¼	1.12½	.....	1.50	.40@.80
St. Louis	1.75	1.50	1.50@**1.65**	1.15@1.25	1.25	**1.62½**	.40@**.87½**
San Francisco	1.37½	1.12½	1.12½	.87½	1.12½	1.37½	.50@.60
Seattle	1.50	1.12½	1.25	1.00	1.12½	1.25	.70

*Minimum rates are for construction other than buildings, non-union.

that wages as low as 30c. have been paid. Demands for eight-hour day and restriction of employment to county citizens rejected by board. Boilermakers who struck June 24 for a 10 per cent advance have accepted a compromise of 5c. per hour, to 95c. for inside and $1.37½ for outside men. Union electricians received an increase of $1.20 per day ($13.20), July 15. Employers agree to pay premiums on life, disability and old age insurance for each electrician hired.

South Bend—Carpenters' strike ended by acceptance of compromise offer of 5c. ($1.10) and five-day week, Aug. 1. Craftsmen at first demanded $1.16. Time and a half is paid for Saturday mornings. First labor dispute in three years.

Minneapolis—Skilled building trades mechanics practically all employed, and considerable decrease in common labor surplus in last two weeks.

New Orleans — Building trades threaten action in sympathy with striking street railway workers because of alleged importation of objectionable strikebreakers by the company.

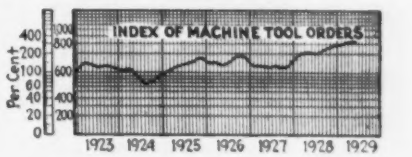
Toronto—Hoisting engineers threaten strike if compelled by new ruling to operate hoists and air compressors at same time.

Average skilled wages are $1.36 2/3, compared with $1.36 1/3 on July 1 and $1.35 a year ago. Average common rate is 53.53c., compared with 52.96c. last month and 56.07c. last year.

Machine-Tool Industry Is Active

Earnings of industrial corporations in the first quarter of this year were 35.7 per cent higher than in the first quarter of 1928, and the pace has been maintained. It is to this fact and to the growing belief in modern machinery that the prosperity of the machine-tool industry is ascribed.

The trend of new orders since 1923 is shown in the accompanying chart. Following the summer slump in 1924 there was a recovery period lasting sixteen months. In 1926 and 1927 conditions remained fairly even at a level



ORDERS FOR MACHINE TOOLS

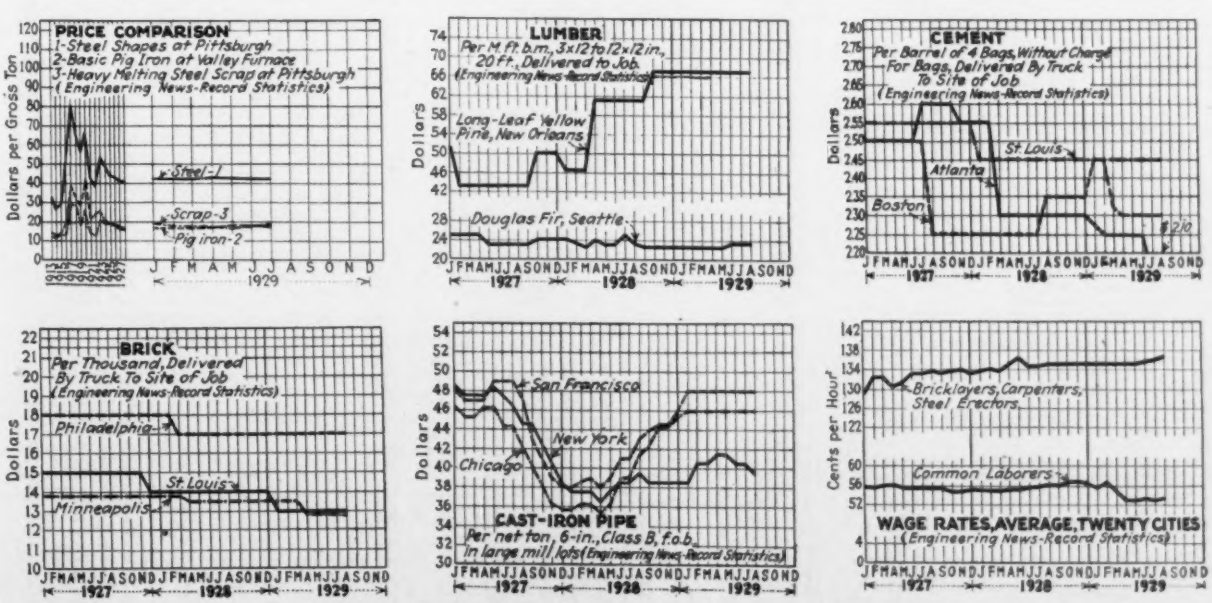
considerably higher than that of 1923. In December, 1927, orders began increasing and continued to do this until June, when orders fell off a little. E. F. DuBeul, general manager of the National Machine Tool Builders' Association, regards the decline as seasonal. Employment is 25 per cent above that of 1928.

Freight Traffic Heavy

Freight traffic this year has been heavier than ever before, according to the American Railway Association. Car supply is ample for all commodities.

Revenue freight in the first 27 weeks this year used 26,505,770 cars, an increase of 4.7 per cent over 1928 and 0.6 over 1927. With the exception of grain and grain products, livestock and forest products, there has been an increase in the loading of all commodities.

Condition of locomotives on July 1 was the best in recent years. There were also fewer freight cars in need of repairs on July 1 than on any similar date in the last seven years except 1927, when conditions were slightly better. There are 39,638 cars on order, the largest number in five years. Locomotive orders aggregate 386, compared with 106 a year ago.


PRICE COMPARISON
1-Steel Shapes at Pittsburgh
2-Basic Pig Iron at Valley Furnace
3-Heavy Melting Steel Scrap at Pittsburgh
(Engineering News-Record Statistics)
Dollars per Gross Ton
Steel-1
Scrap-3
Pig iron-2
J F M A M J J A S O N D
1929
LUMBER
Per M ft. b.m., 3x12 to 12x12 in., 20 ft., Delivered to Job.
(Engineering News-Record Statistics)
Long-Leaf Yellow Pine, New Orleans
Douglas Fir, Seattle
Dollars
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1927 1928 1929
CEMENT
Per Barrel of 4 Bags, Without Charge For Bags, Delivered By Truck To Site of Job
(Engineering News-Record Statistics)
St. Louis
Atlanta
Boston
Dollars
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1927 1928 1929
BRICK
Per Thousand, Delivered By Truck To Site of Job
(Engineering News-Record Statistics)
Philadelphia
St. Louis
Minneapolis
Dollars
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1927 1928 1929
CAST-IRON PIPE
Per net ton, 6-in., Class B, f.o.b. in large mill lots (Engineering News-Record Statistics)
San Francisco
New York
Chicago
Dollars
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1927 1928 1929
WAGE RATES, AVERAGE, TWENTY CITIES
(Engineering News-Record Statistics)
Bricklayers, Carpenters, Steel Erectors
Common Laborers
Cents per Hour
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1927 1928 1929

PRICES OF CONSTRUCTION MATERIALS AND WAGES OF LABOR

Current Prices of Construction Materials

Price advances since last month are indicated by **heavy type**; declines by *italics*

Building Materials

PORTLAND CEMENT—Prices per bbl., quoted by manufacturers and dealers, delivered by truck to contractors, *without charge for bags*. Cash discount not deducted.

	Aug. 1, 1929	One Month Ago	One Year Ago
Atlanta	$2.10	$2.10	$2.25
Baltimore	2.65	2.65	2.65
Birmingham	2.60	2.60	2.60
Boston	2.25@2.35	2.25@2.35	2.35
Cedar Rapids (f. o. b.)	2.24	2.24	2.24
Chicago (f. o. b.)	2.05	2.05	2.05
Cincinnati (f. o. b.)	2.17	2.17	2.22
Cleveland (f. o. b.)	*2.04*	2.14	2.24
Dallas	2.15	2.15	2.40
Davenport (f. o. b.)	2.24	2.24	2.24
Denver	2.55	2.55	2.85
Detroit (f. o. b.)	1.95	1.95	1.90
Duluth (f. o. b.)	2.04	2.04	2.04
Indianapolis, (f. o. b.)	2.09	2.09	2.19
Jersey City	2.60	2.25	2.35
Kansas City, Mo.	2.55	2.55	2.40
Los Angeles	2.86	2.76	2.66
Milwaukee (f. o. b.)	2.20	2.20	2.20
Minneapolis (f. o. b.)	2.22	2.22	2.22
Montreal (f. o. b.)	1.70	1.70	1.41
New Orleans	2.65	2.65	2.20
New York	2.25	2.25	2.25@2.35
Peoria (f. o. b.)	2.22	2.22	2.22
Philadelphia	2.40	2.40	2.31@2.41
Pittsburgh (f. o. b.)	2.05	2.05	2.04
St. Louis	2.45	2.45	2.45
St. Paul (f. o. b.)	2.22	2.22	2.22
San Francisco	2.41	2.41	2.41
Seattle	2.70	2.70	2.70
Toledo (f. o. b.)	2.20	2.20	2.20

Current mill-prices per barrel, in carloads, without bags, f.o.b.:

Alpena, Mich.	$1.65	Lehigh Valley District	$1.75
Buffington, Ind.	1.80	Limedale, Ind.	1.80
Clinchfield, Ga.	1.65	Mason City, Ia.	1.80
Hannibal, Mo.	1.90	Norfolk, Va.	1.90
Houston, Tex.	1.95	North Birmingham, Ala.	1.35
Hudson, N. Y.	1.75	Richard City, Tenn.	1.70
Ironton, Ohio	1.80	Steelton, Minn.	1.85
Iola, Kan.	1.85	Universal, Pa.	1.80
La Salle, Ill.	1.90	Wyandotte, Mich.	1.70

SAND AND GRAVEL—Dealers' quotations per cu.yd. delivered. Weight of sand, 1¼ tons per cu.yd.; gravel, 1½ tons per cu.yd., unless otherwise specified in pounds.

	Gravel		Sand
	1½ In.	¾ In.	
Atlanta, per ton	$2.65	$2.65	$2.00
Baltimore, per ton	2.40	2.60	1.70
Birmingham (2,600 lb.)	3.00	3.00	2.65
Boston, per ton	1.90	1.90	1.25
Chicago	1.90	1.90	1.90
Cincinnati, per ton	1.90	1.90	1.60
Cleveland	2.60	2.60	2.50
Dallas	2.60	2.60	2.25
Denver (2,700 lb.)	1.80	1.80	1.30
Detroit (2,600 lb.)	3.25	3.25	2.75
Kansas City, Mo.	.....	.....	.....
Los Angeles, per ton	2.15	2.15	**2.15**
Minneapolis (2,800 lb.) (3,000 lb.)	2.40	2.40	1.10
Montreal, per ton	1.90	1.90	1.20
New Orleans (2,700 lb.) (2,500 lb.)	3.75	3.75	2.75
New York	3.25	3.25	2.00
Philadelphia, per ton	2.30@3.15	2.30@3.15	1.50@2.31
Pittsburgh, per ton	.....	.....	.....
St. Louis, per ton	2.35	2.25	2.00
San Francisco (2,800 lb.)	1.75	1.75	1.50
Seattle (3,200 lb.) (2,850 lb.)	1.75	1.75	1.75

Note: New York gravel weighs 2,800@3,000 lb. and sand, 2,700 lb.

CRUSHED STONE—Dealers' quotations per cu.yd., delivered. Weight, 1½ tons per cu.yd., unless otherwise specified in pounds:

	1½ In.	¾ In.
Atlanta, per ton	*$2.65*	*$2.65*
Baltimore, per ton	2.75	2.85
Birmingham, Limestone	3.00	3.25
Boston, per ton	2.25	2.25
Chicago, Limestone	1.90	1.90
Cincinnati, per ton	2.50	2.50
Cleveland, per ton	2.70	2.70
Dallas	3.25	3.40
Denver, Granite (2,700 lb.)	2.50	2.50
Detroit, Limestone, per ton	3.00	3.00
Kansas City, Limestone, per ton	.....	.....
Los Angeles, per ton	2.15	2.15
Minneapolis, Limestone (2,600 lb.)	2.40	2.40
Montreal, per ton	2.10	2.10
New York, Limestone	3.25	3.25
Philadelphia, Limestone, per ton	2.30@3.15	2.30@3.15
Pittsburgh, per ton	2.75	2.75
St. Louis, per ton (2400 lb. per cu.yd.)	1.95	1.95
San Francisco, Trap rock (2,400 lb.)	1.65	1.65
Seattle, (2,700 lb.)	1.90	1.90

CRUSHED SLAG—Manufacturers' quotations on crushed slag in carloads, per net ton, at plant:

	1½-In.	¾-In.	Roofing	Sand
Birmingham, Ala.	$0.90	$1.15	$2.05	$0.55
Buffalo District	1.25	1.35	2.25	1.25
Cleveland, Ohio	1.15	1.15	.....	.80
Eastern Pa. and Northern N. J.	1.25	1.25	2.00	1.25
Toledo, Ohio	1.25	1.25	1.50	1.25
Western Pennsylvania	1.25	1.25	2.00	1.25
Youngstown District	1.30	1.40	2.00	1.30

HOLLOW TILE—Dealers' quotations on hollow building tile per block, delivered to contractors in lots of 2,000 pieces or over:

	4x12x12	6x12x12	8x12x12	10x12x12	12x12x12
Atlanta	$0.072	$0.099	$0.135	$0.181	$0.202
Baltimore	.105	.....	.20	.....	.26
Birmingham	.09	.127	.174	.218	.261
Boston	.085	.11	.15	.1875	.255
Chicago	.076	.104	.142	.182	.202
Cincinnati	.074	.105	.136	.175	.205
Cleveland	.064	.088	.128	.171	.19
Dallas	.096	.12	.1785	.29	.....
Denver	.0975	.135	.175	.2125	.25
Detroit	**.098**	**.135**	**.184**	**.24**	**.265**
Kansas City	.0525	.077	.158	.....	.242
Los Angeles	.085	.122	.175	.232	.285
Minneapolis	.0675	.0845	.131	.134	.1896
Montreal	.12*	.....	.22†	.....	.....
New Orleans	.086	.118	.16	.212	.256
New York	.0864	.1296	.162	.....	.....
Perth Amboy, N.J. (f.o.b.)	.....	.....	.....	.2388	.2956
Philadelphia	.105	.14	.215	.28	.34
Pittsburgh	.068	.....	.1175	.....	.1726
St. Louis	.078	.104	.145	.175	.21
San Francisco	.108	.156	.255	.....	.....
Seattle	.085	.115	.18	.....	.....

*4x4x12. †8x8x12.

BRICK—Dealers' quotations, delivered, per thousand are as follows:

	Common	Paving 3x8¼x4-in.	Paving 3¼x8¼x4-in
Atlanta	$12.75	$38.00*	$45.00†
Baltimore	*14.00*	40.00	46.00
Birmingham	15.00	30.00*	34.00†
Boston	*16.50*	43.00	48.00
Chicago	12.00	42.00	45.00
Cincinnati	18.00	40.00	45.00
Cleveland	14@16	33.00	36.00
Dallas	14.50	35.00	.....
Denver, salmon	12.00	.....	.....
Detroit	**15.50**	34.50	38.50
Kansas City	14.00	.....	.....
Los Angeles	11.00	.....	.....
Minneapolis	12.75	.....	.....
Montreal	20.33	.....	.....
New Orleans	16.50	40.00*	50.50
New York	13.50@14.50	45.00	51.00
Philadelphia	17.00	40.00	46.00
Pittsburgh	17.00	40.50	45.00
St. Louis, salmon	13.00	40.00	42.50
San Francisco	14.50	40.00	45.00
Seattle	14.00	50.00	55.00

*2¼x8¼x4 in. †3x8¼x4.

LIME—Dealers' quotations, delivered to job:

	Hydrated, per Ton		Lump, per Barrel	
	Finishing	Common	Finishing	Common
Atlanta	$21.00	$11.50	.....	.....
Baltimore	20.00	14.00	$2.55†	.....
Birmingham	22.00	16.00	3.00†	$2.00†
Boston	21.00	14.50	3.80*	2.90*
Chicago	18.00	14.00	18.00‡	1.35†
Cincinnati	18.00	13.20	.....	13.20‡
Cleveland	20.00	16.00	2.50†	2.50†
Dallas	20.00	.....	.....	18.00‡
Denver	32.00	23.75	3.80*	3.00*
Detroit	19.20	14.80	2.20†	2.20†
Kansas City	16.00	12.50	.....	.....
Los Angeles	25.00	18.00	2.85†	17.00‡
Minneapolis	25.50	21.00	.....	1.70†
Montreal	19.75	.....	.....	15.00‡
New Orleans	.....	.....	2.60†	1.60†
New York	21.00@22.00	14.00@15.00	4.00@4.10*	3.15@3.25*
Philadelphia	22.00	15.00	.....	.....
Pittsburgh	*20.00*	19.00	.....	.22
St. Louis	24.00	18.00	2.75†	15.00‡
San Francisco	27.50	20.00	.....	1.70†
Seattle, paper sacks	36.00	24.00	.....	2.80†

*Per 280-lb. bbl. (net). †Per 180-lb. (net). ‡Per ton.

CONCRETE BLOCKS—Manufacturers' quotations on standard, 8x8x16-in., hollow, delivered to job, each:

Boston	$0.18@.20	Minneapolis	$0.15
Brooklyn and Queens	*.12@.14*	New Orleans	.22
Cleveland	.16@.17	Philadelphia	.18@.25
Denver	.22	Pittsburgh	.20
Detroit	.15	St. Louis	.18

SLATE—Roofing, genuine Bangor, f.o.b., quarry, Bangor, Pa., per square:

No. 1 Clear	$10.50@$14.00
No. 1 Ribbon	9.00@10.25
Medium Clear	9.50@11.25

Road and Paving Materials

PAVING STONE—Dealers' quotations, f.o.b., in carloads or in cargo lots, for granite blocks, 4x8x4-in., dressed:

Atlanta	$3.00 per sq.yd
Baltimore	3.00 per sq.yd.
Boston	135.00 per M.
Chicago, 5 in.	3.25@3.90 per sq.yd.
Cincinnati	110.00 per M.
Cleveland	115@120 per M
Detroit, 5 in.	3.00 per sq.yd.
Kansas City	3.50 per sq.yd.
Minneapolis, Sandstone, 4½x8x5 in.	2.80 per sq.yd.
Montreal	104.75 per M.
New Orleans	2.80 per sq.yd.
New York, 5 in., Grade 1, 30 blocks per sq.yd.	150.00 per M.
Philadelphia	125.00 per M.
St. Louis, 4x5x8 to 12 in.	3.50 per sq.yd.
San Francisco, Basalt block, 4x7x8 in.	70.00 per M.

Current Prices of Construction Materials

Road and Paving Materials—Continued

WOOD-BLOCK PAVING—Dealers' quotations, f.o.b., in carloads:

	Size of Block	Treatment	Per Sq.Yd.
Atlanta	3½	16	$2.25
Boston	3½	16	2.50
Chicago	3½	12	2.10
Cincinnati	3½	16	2.35
Dallas	3½	18	3.90
Kansas City	3½	16	2.75
Minneapolis	3½	16	2.75
Montreal	4	16	4.50
New Orleans	3½	16	2.50
New York	3½	16	2.70
St. Louis	3½	16	2.30

FLAGGING—Dealers' quotations, alongside dock, New York: Manhattan and Bronx, 4 ft. wide, 24c. per sq.ft.; Queens, 5 ft. wide, 26c. per sq.ft.

CURBING—Dealers' quotations: *New York*: Bluestone, f.o.b. barge, New York, 5x16 in., rough, 90c. per lin.ft., cutting charges extra. *Birmingham*: Limestone, 5x18-in., f.o.b., $1.05 per lin.ft. *St. Louis*: Class "B" straight, 5x16 in., f.o.b., $1.00 per lin.ft.; roundings, $1.50 per lin.ft.

ASPHALT—Manufacturers' quotations per ton in packages (350-lb. bbls. or 425-lb. drums); also in bulk in carload lots, f.o.b. points listed:

	Package	Bulk
Atlanta (Mexican)	$22.55	$18.40
Baltimore (Standard Oil, f.o.b. refinery)	21.75	17.75
Birmingham (Mexican)	27.00	23.00
Boston (Mexican)	23.50	18.00
Chicago (Texas)	23.50	19.30
Cincinnati (Kentucky Rock)	.....	12.30
Cleveland	24.00	20.00
Dallas (Texas)	23.75	.....
Denver (California)	35.00	.....
Detroit (Mexican)	19.72	15.69
Kansas City, Mo. (Texas)	25.30	20.30
Los Angeles ("D" Grade, Calfornia, f.o.b., El Segundo)	18.00	12.00
Maurer, N. J. (Bermudez)	30.00	.....
Maurer, N. J. (Trinidad)	25.00	.....
Minneapolis, (Stanolind, f.o.b., Twin Cities)	24.10	19.10
Montreal (Imperial)	28.00	21.50
New Orleans (Texas)	24.00	21.00
New York (Texas)	22.50	18.50
Philadelphia (Mexican)	18.00	15.00
Pittsburgh (Standard Oil)	24@26	14@18
St. Louis (Mexican)	21.50	17.50
San Francisco, (f.o.b. refinery, Oleum, Calif.)	18.00	12.00
Seattle, ("D" grade, California, f.o.b., Richmond refinery)	19.50	13.50

ROAD OILS—Manufacturers' quotations, f.o.b., in tank cars, 8,000 gal. minimum, per gal.:

Birmingham, 40@50% asphalt	$0.0525
Birmingham, 50@60% asphalt	.0525
Dallas, 40@50% asphalt	.06
Dallas, 50@60% asphalt	.06
New York, 40@50% asphalt (at terminal)	.05
New York, 50@60% asphalt (at terminal)	.05
St. Louis, 40@50% asphalt	.0342
St. Louis, 50@60% asphalt	.0357

Iron and Steel

PIG IRON—Producers' quotations, per gross ton, f.o.b.:

Birmingham, No. 2 fdry., silicon 1.75@2.25	$14.50
Pittsburgh, basic, incl. freight ($1.76) from Valley	19.26

STRUCTURAL STEEL—Manufacturers' and dealers' quotations per 100 lb.:

	Shapes, 3 to 15-In.	Plates, ¼-In
Birmingham, large mill lots, f.o.b.	$2.15	$2.15
Chicago, warehouse, delivered	3.10	3.10
Cleveland, warehouse, delivered	3.00	3.00
Dallas, warehouse, delivered	3.60	3.60
New York, warehouse, delivered, up to 3,999 lb.	3.30	3.30
Pittsburgh, large mill lots, f.o.b., (July 25, 1929)	1.95	1.95
St. Louis, warehouse, delivered	3.25	3.25
San Francisco, warehouse, delivered	3.15	3.15

BARS, CONCRETE REINFORCING—Manufacturers' and dealers' quotations on bars rolled from billets, per 100 lb. for ½-in.:

Birmingham, large mill lots, f.o.b.	$2.15
Chicago, warehouse, delivered	2.40@3.00
Cleveland, warehouse, delivered	2.25@2.44
Dallas, warehouse, delivered	3.40
New York, warehouse, delivered, over 5 tons	2.90
Pittsburgh, large mill lots, stock lengths, f.o.b.	2.00
St. Louis, warehouse, delivered	3.15
San Francisco, warehouse, delivered	2.25

EXPANDED METAL LATH—Dealers' quotations per 100 sq.yd., painted, delivered to job in less-than-carload lots:

Lb. per Sq. Yd.	New York	Birmingham	Chicago	St. Louis	Dallas	San Francisco
2.2	$17.50@$19.00	$26.00	$24.50	$22.00	$27.50	$28.50
2.5	18.50@20.00	27.00	25.50	23.00	29.00	29.50
3.0	20.00@21.00	29.00	27.00	25.00	31.00	32.00
3.4	22.00@22.50	30.50	28.00	26.50	32.50	34.00

WIRE REINFORCEMENT FOR CONCRETE—Manufacturers' quotations per 100 sq.ft. in carloads at mills; and dealers, delivered in lots of 10,000 sq.ft. or over; plain 4 in. by 4 in. mesh:

Style Number	Weight in Pounds per 100 sq.ft.	Pittsburgh Mill	Chicago District Mill	Warehouse Delivery: New York	St. Louis	Dallas	San Francisco
032	22	$0.99	$1.01	$1.39	$1.45	$1.13	$1.22
049	28	1.26	1.29	1.76	1.80	1.38	1.55
068	35	1.54	1.58	2.18	2.25	1.67	1.91
093	40	1.98	2.03	2.79	2.90	2.00	2.46
126	57	2.45	2.51	3.45	3.55	2.55	3.03
153	68	2.92	2.99	4.13	4.25	3.15	....
180	78	3.35	3.43	4.73	4.85	3.47	....

STEEL SHEETS—Manufacturers' and dealers' quotations per 100 lb., base:

	Blue Annealed No. 10 *	Black No. 24	Galvanized No. 24
Chicago, warehouse, delivered	$3.35	$4.05	$4.90
Cleveland, warehouse, delivered	3.25	3.90	4.75
New York, warehouse, delivered	3.90†	4.00	4.75
Pittsburgh, large mill lots, f.o.b.	2.10@2.20	2.85	3.50@3.60
St. Louis, warehouse, delivered	3.45	4.25	5.10
San Francisco, warehouse, delivered	3.80	4.90	5.30

*Light plates. †Up to 3,999 lb.

WIRE ROPE—Discounts from manufacturers' list price on regular grades of bright and galvanized, Eastern Territory, New York, and East of Missouri River:

	Base
Cast steel round strand rope	20%
Galvanized iron rigging and guy rope (add to list)	12½%
Galvanized steel rigging and guy rope	7½%
Plow steel round strand rope	35%
Round strand iron and iron tiller	5%
Special steel round strand rope	30%

Discount 5 points less than discount for Eastern territory: California, Oregon, Nevada, Washington, Wyoming, New Mexico, Colorado, North Dakota, Nebraska, Kansas, Oklahoma and Texas. Discount 10 points less than discount for Eastern territory: Arizona, Montana, Idaho and Utah.

RIVETS—Manufacturers' and dealers' quotations on structural rivets, round-head, ½-in., full kegs, per 100 lb.:

Chicago, warehouse, delivered	$4.00
Dallas, warehouse, delivered	4.90
New York, warehouse, delivered	4.50*
Pittsburgh, large mill lots, f.o.b.	3.10
St. Louis, warehouse, delivered	3.95
San Francisco, warehouse, delivered	5.65
Seattle, warehouse, delivered	5.50

*This price is for full kegs; broken kegs are $6.00 per 100 lb.

STEEL SHEETPILING—The manufacturers' base price, f.o.b., Pittsburgh, for large mill lots is $2.25 per 100 lb.

TERNE PLATE—I C, 8-lb. coating, 20x28-in., f.o.b., Pittsburgh mill:

Per package	$11.20

SHIP SPIKES—Dealers' quotations per 100 lb., black, from warehouse stocks; galvanized are about $1.75 per 100 lb. higher:

	½-In.	⅝-In.	¾-In.
San Francisco	$5.55	$5.10	$4.95
Seattle	7.75	5.65	5.50

Pittsburgh mill base in lots of 200 kegs or more, $3.00 per 100 lb.

WIRE NAILS—Dealers' quotations per 100 lb. keg, base, delivered from warehouse stocks, also Pittsburgh mill base:

Pittsburgh Mill	Birmingham	Chicago	St. Louis	Dallas	San Francisco	Montreal
$2.65@$2.75	$3.30	$3.20	$3.05	$3.75	$3.35	$4.95

SCRAP—The prices following are, f.o.b., per ton, paid by dealers:

	New York Per Gross Ton	Chicago Per Gross Ton	Detroit Per Gross Ton
No. 1 railroad wrought	$12.00@$12.50	$15.00@$15.50	$15.00
Stove plate	8.00@8.50	13.00@13.50	10.50@11.00*
No. 1 machinery cast	15.00@17.00	16.00@16.50	12.00@12.50*
Machine shop turnings	7.25@7.75	7.50@8.00	7.25
Cast borings	7.00@7.25	10.00@10.50	9.75
Railroad malleable	14.00@14.50	16.50@17.00	14.00
Re-rolling rails	13.00@13.50	17.50@18.00	15.00
Re-laying rails, 56@60 lb.	23.00@24.00	23.00@25.00	.....
Heavy melting steel, No. 1	12.75@13.25	14.75@15.25	14.50@15.00
Iron and steel pipe	10.75	10.00@10.50	8.75@10.50

*Net ton.

FREIGHT RATES—On finished steel products in the Pittsburgh district, including plates, structural shapes, merchant-steel bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates are effective in cents per 100 lb., in carload lots of 36,000 lb. or 18 tons:

Atlanta	$0.58	Detroit	$0.29
Baltimore	.31	Kansas City	.71*
Birmingham	.58	New Orleans	.67
Boston	.365	New York	.34
Buffalo	.265	Pacific Coast (all rail)	1.15†
Chicago	.34	Philadelphia	.32
Cincinnati	.27	St. Louis	.405
Cleveland	.19	St. Paul	.60
Denver	1.15†		

*Except iron or steel pipe and fittings. †Minimum weight on structurals, 60,000 lb.

Railway Materials and Supplies

STEEL RAILS—Manufacturers' quotations per gross ton, f.o.b., for large mill lots:

	Pittsburgh	Birmingham	Chicago
Standard openhearth rails	$43.00	$43.00	$43.00
Light rails, 25 to 45 lb.	36.00	34@36	34@36
Re-rolled rails	34.00	34@36	34@36

RAILWAY TIES—Dealers' quotations, f.o.b., for fair-sized orders:

		6 In. x 8 In. by 8 Ft.	7 In. x 9 In. by 8½ Ft.
New York	Long-leaf sap pine, untreated	$1.10	$1.30
	Creosoted—prices on application.		
Birmingham	Southern pine, untreated	1.10	1.25
	Southern pine, creosoted	1.60	1.75
Chicago	White oak, untreated	1.40	1.78
	Oak, empty cell, creosoted	1.80	2.40
	Oak, zinc treated	1.60	2.10
	Southern pine, creosoted	1.60	2.10
St. Louis	White oak, untreated	1.35	1.60
	Red oak, creosoted	1.45	2.05
San Francisco	Sap pine or cypress, untreated	.90	1.20
	Douglas fir, green, untreated	.82	1.14
	Douglas fir, empty cell, creosoted	1.73	2.32
Montreal	Birch or maple, untreated	.75@1.25	.75@1.25
	Birch or maple, creosoted	1.20@1.30	1.50@1.60

Current Prices of Construction Materials

Railway Supplies—Continued

TRACK SUPPLIES—Manufacturers' and dealers' quotations per 100 lb, f.o.b., Pittsburgh mill, for large mill lots, together with warehouse prices at other places named:

	Pittsburgh	Chicago	Birmingham	St. Louis	San Francisco
Standard spikes, ⅜-in. and larger	$2.80	$3.55	$3.50	$3.65@$3.95	$3.85
Track bolts	3.80	4.55*	4.50	4.80@ 4.95	4.85
Standard section angle bars, splice bars or fish plates	2.75	3.40	3.50	.....	.....

Tie plates: Price at Pittsburgh and Chicago mills, $2.15 per 100 lb.

Pipe

WROUGHT-STEEL PIPE—Discounts from manufacturers' and dealers standard lists:

	1 to 3-In. Butt Weld		2½ to 6-In. Lap Weld	
	Black	Galvanized	Black	Galvanized
Chicago, warehouse, delivered	54%	41%	51%	38%
Cleveland, warehouse, delivered	55½%	43½%	53½%	40½%
New York, warehouse, delivered	50%	36%	45%	32%
Pittsburgh, large mill lots, f.o.b.	62%	50½%	59%	47½%
St. Louis, warehouse, delivered	49%	36%	46%	33%

CAST-IRON PIPE—Prices of U. S. Pipe & Foundry Co., per net ton, for bell and spigot pipe, Class B and heavier, f.o.b., on regular lots of pipe:

	4-In.	6-In. and Over
Birmingham mill	$41.00	$38.00
Burlington (N. J.) mill	*40.00*	*37.00*
Chicago	49.20	46.20
New York	*42.60*	*39.60*
Pittsburgh	49.50	46.50
St. Louis	46.60	43.60
San Francisco	51.00	48.00

Gas pipe and Class A, $3.00 per ton extra.

SEWER PIPE—Dealers' quotations, delivered, in cents per foot, for standard pipe; 6, 8 and 12-in. are single strength and 18, 24, 30 and 36-in. are double strength:

	6-In.	8-In.	12-In.	18-In.	24-In.	30-In.	36-In.
Atlanta	$0.13½	$0.22½	$0.75	....	.....	.....	.....
Baltimore	.....	.30	.58	.....	$1.93	.....	$6.50
Birmingham	.25	.40	.65	*1.50	2.75	$3.90	5.83
Boston	.185	.30	.55	1.30	2.15	3.50	5.90
Chicago	.15	.28	.54	1.25	2.25	4.75	6.00
Cincinnati	.144	.224	.432	.80	1.44	2.304	4.8175
Cleveland	.18	.28	.54	1.30	2.34	4.68	7.18
Dallas	.256	.42	.794	1.70	3.00	.....	.....
Denver	.161	.23	.414	.816	1.44	.....	.....
Detroit	.18	.28	.6075	1.50	2.70	5.12	7.91
Kansas City	.21	.29	.52	.....	1.90	3.80	.....
Los Angeles	.21	.2825	.51	1.186	2.03	3.39	5.09
Minneapolis	.16	.25	.50	1.15	1.84	3.49	4.97
Montreal	.36	.53	.78	1.48	2.75	4.20	.....
New Orleans	.195	.325	.585	1.10	2.11	.....	.....
New York	.185	.29	.56	1.35	2.45	4.60	7.07
Philadelphia	.117	.182	.351	1.05	1.89	3.60	5.6375
Pittsburgh	.0945	.147	.2835	.85	1.53	3.024	4.8175
St. Louis	.1645	.26	.468	1.092	1.872	3.65	4.80
San Francisco	.21	.30	.54	1.26	2.16	3.60	.....
Seattle	.22	.30	.54	1.26	2.16	3.60	.....

CLAY DRAIN TILE—Dealers' quotations, delivered, per 1,000 lin.ft.:

Size, In.	New York	Birmingham	St. Louis	Dallas	San Fran.	Seattle
4	$55.00	$56.00	$50.00	$63.00	$67.50	60.00
6	112.00	105.00	112.00	110.00	112.50	112.00

Miscellaneous

LINSEED OIL—Dealers' quotations on raw oil, f.o.b., in 1- to 4-bbl. lots, per lb.:

New York....$0.133 Chicago....$0.137 Minneapolis....$0.14

WHITE AND RED LEAD—Dealers' quotations per 100-lb. keg, base price, f.o.b., New York: White, dry or in oil, $13.75; Red, dry, $13.75; Red, in oil, $15.25.

CHEMICALS—Water, sewage treatment, road work, round lots in the New York market:

Sulphate of aluminum, iron free, in bags, per 100 lb	$2.00@$2.10
Sulphate of copper, in bbl., per 100 lb	6.00@ 6.10
Soda ash, 58%, in bags, per 100 lb	1.32@ 1.35
Chlorine, cylinders, per lb	.05@ .08
Bleaching powder, in drums, f.o.b. works, per 100 lb	2.00@ 2.10
Calcium chloride, in drums, f.o.b. works, per ton	20.00

MANILA ROPE—The number of feet per pound for the various sizes is as follows: ½-in., 8-ft.; ⅝-in., 6-ft.; ¾-in., 4½-ft.; 1-in., 3½-ft.; 1¼-in., 2-ft., 10-in.; 1½-in., 2-ft. 4-in. Following are dealers' quotations per pound for ¾-in. and larger, delivered in 1,200-ft. coils:

Atlanta	$0.25	Kansas City	$0.29
Baltimore	.225	Los Angeles	.25
Birmingham	.26	Minneapolis	.24
Boston	.23	Montreal	.245
Chicago	.22	New Orleans	.25
Cincinnati	.21	New York	.215
Cleveland	.21	Philadelphia	.24
Dallas	.20	San Francisco	.205
Denver	.25	Seattle	.205
Detroit	.24	St. Louis	.215

BUILDING PAPER—Black, in carloads, per roll of 500 sq.ft., f.o.b., producing point $2.08

SLATERS FELT—In carloads, per roll, f.o.b., producing point $0.91½

ROOFING MATERIALS—Dealers' quotations, f.o.b., New York, to contractors in carloads:

Asphalt felt, per 100 lb	$2.60
Tar felt, per 100 lb	2.60
Asphalt coating, per gal	.34½
Tar pitch, in 350 lb. barrels, per ton	28.00

PREPARED ROOFINGS—Dealers' quotations to contractors, in carloads, f.o.b. New York:

Single shingles, slate finish, sufficient to cover 100 sq.ft.	$6.12½
Strip shingles, 4 in 1, hexagonal shape, with Underwriters' label	5.00
Slate surfaced roofing in rolls weighing 85 to 90 lbs	2.50

WINDOW GLASS—United inches 25, bracket size 6x8 to 10x15, single or double thickness, discount from jobbers' list (Sept. 15, 1928), at New York warehouses:

AA .....83% A .....86% B.....88%

EXPLOSIVES—Manufacturers' quotations per pound for dynamite delivered in small lots, under 200 lb.:

	Gelatin 40%	Gelatin 60%		Gelatin 40%	Gelatin 60%
Atlanta	$0.22	$0.245	Los Angeles, f.o.b.†	$0.1875	$0.2225
Baltimore	.215	.2375	Minneapolis	.1925	.2125
Birmingham	.22	.245	Montreal	.195	.22
Boston	.225	.25	New Orleans	.195	.22
Chicago	.195*	.22*	New York	.255‡	.2775‡
Cincinnati	.22	.245	Philadelphia	.215	.24
Dallas	.18	.216	St. Louis	.215	.235
Denver, f.o.b.	.19	.2125	San Francisco	.1625	.1925
Kansas City, Mo.	.2025	.2225	Seattle	.16	.185

*Quantities above 500 lb. but less than a ton. †San Fernando Arsenal. ‡Special gelatin in case lots.

Lumber

Prices Are Per Thousand Feet, Board Measure

New York—Timbers, No. 1 common, rough, delivered to contractor at site of job, in 20 ft lengths and under, per M. ft., b.m.:

	Long-leaf Yellow Pine	Douglas Fir
3x4 to 8x8	$57.00	$43.00
3x10 to 10x10	65.00	43.00
3x12 to 12x12	75.00	46.00
3x14 to 14x14	87.50	50.00

Chicago—Dealers' quotations, f.o.b., in carloads, No. 1 Common, rough, per M. ft. b.m. For delivery to job from stock, in truckloads, add $10 per M. ft.:

	20 Ft. and Under Long-Leaf Yellow Pine	Up to 32 Ft. Douglas Fir
3x4 to 8x8	$43.00	$42.00
3x10 to 10x10	50.50	42.00
3x12 to 12x12	62.50	42.00
3x14 to 14x14	74.50	43.00

San Francisco—Dealers' quotations on rough Douglas fir, No. 1 common, at yards. For delivery to contractor at site of job, add $1.50 to $5 per M. ft.:

	10-16-18 and 20 Ft.	22 and 24 Ft.
3x3 and 4	$28.00	$29.00
3x6 and 8	28.00	29.00
3x10 and 12	28.00	29.00
3x14	31.00	33.00

Other Cities—Dealers' quotations, delivered, No. 1 Common, rough, per M. ft:

	8x8-In. x 20 Ft. and Under				3x12 to 12x12-In. 20 Ft. and Under	
	Pine*	Fir†	Hemlock	Spruce	Pine*	Fir†
Atlanta	$47.50	.....	.....	$61.00	$67.50	.....
Baltimore	36.00	$50.00	$53.50	$61.00	75.00	$50.25
Birmingham	45.00	.....	.....	.....	60.00	.....
Boston	48.25	47.00	47.50	48.50	57.50	52.00
Cincinnati	52.50	62.50	.....	.....	70.00	57.50
Cleveland	65.00	65.00	.....	.....	65.00	65.00
Dallas	65.00	57.50	57.50	55.00	65.00	57.50
Denver	.....	57.00	57.00	55.00	.....	55@58
Detroit	*58.75*	*49.50*	.....	.....	68.50	*50.25*
Kansas City, Mo.	50.00	50.00	.....	.....	*55.00*	55.00
Los Angeles	.....	44.00	.....	.....	.....	44.00
Minneapolis	58.00	53.25	38.25‡	.....	58@60	53.25@54.75
Montreal	50.00	55.00	.....	.....	50.00	48.00
New Orleans	50.00	46.00	.....	44.00	67.00	63.00
Philadelphia	52.00	44 00	44.00	50.00	62.00	43@45
Pittsburgh	65.00	70.00	75.00	65.00	65.00	65@72
St. Louis	45.50	39.00	.....	.....	56.50	39.50
Seattle	.....	23.00	.....	.....	.....	23.50

	1x10 In. x 16 Ft. and Under			2x10 In. x 16 Ft. T. & Gr.	
	Pine*	Fir†	Hemlock	Pine*	Fir†
Atlanta	$60.00	.....	.....	$40.00	.....
Baltimore	56.00	$45.00	$45.00	.....	.....
Birmingham	36.00	.....	.....	43.00	.....
Boston	44.50	43.00	42.25	48.00	$47.50
Cincinnati	65.00	57.50	.....	42.00	55.00
Cleveland	60.00	55.00	.....	65.00	58.00
Dallas	60.00	.....	.....	.....	.....
Denver	.....	46.00	46.00	.....	50.00
Detroit	45.00	42.00	.....	46.50	44.00
Kansas City, Mo.	55.00	55.00	.....	46.00	46.00
Los Angeles	.....	38.00	.....	.....	57.00
Minneapolis	53.00	47.00	39.75‡	51.00	46.00
Montreal	56.00	48.00	40.00	.....	.....
New Orleans	43.00	40.00	.....	50.00	46.00
Philadelphia	53.00	44 00	42.00	57.00	45.00
Pittsburgh	*50.00*	60.00	59.00	*42.00*	.....
St. Louis	39.00	41.00	38.00	39.00	37.00
Seattle	.....	21.00	.....	.....	23.00

*Long-leaf yellow pine. †Douglas fir. ‡F.o.b.

PILES—Dealers' quotations per lineal foot, pine, with bark on, f.o.b., New York:

Diameters	Points	Length	Barge	Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.14½	$0.18
12 in.—2 ft. from butt	6 in.	50 to 59 ft.	.19	.23
12 in.—2 ft. from butt	6 in.	60 to 69 ft.	.21½	.25
14 in.—2 ft. from butt	6 in.	50 to 69 ft.	.25½	.34
14 in.—2 ft. from butt	6 in.	70 to 79 ft.	.27½	.36
14 in.—2 ft. from butt	5 in.	80 to 89 ft.	.35	.41

CONSTRUCTION NEWS

Some of the Week's Large Projects

AMONG the announcements for the current week are the following:

Proposed Work

Apartment hotel, New York, N. Y., Chanin Constr. Co., New York, $16,000,000.

Gas pipe line, Sacramento, Calif., Pacific Gas & Electric Co., San Francisco, est. $13,100,000.

Schools, San Antonio, Tex., voted $3,700,000.

Mill, Everett, Wash., Puget Sound Pulp & Timber, $3,000,000.

Hospital, Richmond, Va., Medical College of Virginia, expending $2,500,000.

Apartment, St. Louis, Mo., Syndicate forming, c/o Harry Newman, Inc., sketches, $2,500,000.

Office, Hartford, Conn., State, $2,250,000.

Grain elevator, Galveston, Tex., Galveston Wharf Co., bids after Aug. 10, est. $2,000,000.

High school, Boston, Mass., Schoolhouse Dpt., $1,500,000.

Hotel, Sioux City, Ia., Syndicate, c/o F. S. Martin Realty Co., sketches, $1,500,000.

Schools, Norman, Okla., University of Oklahoma, sketches, $1,500,000.

Office, Los Angeles, Calif., Ferguson Corp., $1,500,000.

Market, Fort Worth, Tex., A. M. Owsley, Dallas, $1,350,000.

Hospital, Springfield, Mass., Springfield Hospital, $1,200,000 funds being raised.

Plant, New Westminster, B. C., Westminster Paper Co., $1,100,000.

Apartment, New York, N. Y., Forty Seven East 88th Street, bids after Sept. 1, separate contracts, $1,100,000.

Station, Hamilton, Ont., Canadian Natl. Rys., Toronto, bids in fall, $1,000,000.

Sheds, Boston, Mass., New York, New Haven & Hartford R.R., New Haven, Conn., $1,000,000.

Cold storage, etc., Jersey City, N. J., Pennsylvania R.R. Co., Phila., Pa., $1,000,000.

Waterworks, San Francisco, Calif., City and San Francisco Co., $1,000,000.

Waterworks, Everett, Wash., soon takes bids, $1,000,000.

Apartment hotel, San Antonio, Tex., Swiss Plaza Co., $1,000,000.

Hotel, Niagara Falls, Ont., United International Hotels Inc., Niagara Falls, N. Y., $1,000,000.

Hospital, etc., New York, N. Y., Home of the Daughters of Jacob, $1,000,000.

High school, Salt Lake City, Utah, City, School Bd., sketches, $1,000,000.

Office, Portland, Ore., British American Consolidated Properties Ltd., Toronto, Ont., $1,000,000.

Airport, Alameda, Calif., S. F. Bay Airdrome, Inc., soon takes bids, $1,000,000.

Bids Asked

Apartment, New York, N. Y., J. Paterno, New York, taking bids materials and sub-contracts, $4,000,000.

Apartment, New York, N. Y., Shelton Holding Corp., bids about Sept. 22, separate contracts, $2,225,000.

Grain elevator, Kingston, Ont., Canada Steamship Lines, Toronto, taking bids, $2,000,000.

Pier, Long Beach, Calif., Neptune Pier Co., taking bids, $2,000,000.

Office, Long Island City, N. Y., T. R. Eilenberg, archt., Flushing, taking bids foundation, for New York & Queens Light & Power Co., Bridge Plaza, bids after Sept. 1, super-structure, $1,075,000.

Hotel, Pinewald, N. J., Sangor Hotel Corp., Newark, taking bids separate contracts, $1,000,000.

Public Bond Elections, coming and decided, are listed on Construction News page 59.

Bids Received

House of detention, New York, N. Y., R. C. Patterson, Jr., comr. Correction Dept., from Pstay & Fuhrman Inc., New York and others, totaling $1,469,472.

Contracts Awarded

Office, Chicago, Ill., Burnham Bros., archts., general contract to O. W. Rosenthal-Cornell Co., Chicago, for J. T. Cuneo, est. $8,000,000.

Waterworks, Detroit, Mich., Dept. Water Supply, substructure filtration plant, to W. E. Wood Co., Detroit, $1,572,898.

Apartment, Chicago, Ill., Syndicate, c/o C. W. Nicol, archt., Chicago, general contract to Fleisher Eng. & Constr. Co., Chicago, est. $1,500,000.

Roundhouse, Somerville (br. Boston), Mass., Boston & Maine R.R., Boston, to Tredennick-Billings Co., Boston, est. $1,500,000, concrete piles to Raymond Concrete Tile Co., Boston, est. $25,000.

Apartment, St. Louis, Mo., H. C. Felter, St. Louis, separate contracts, $1,250,000.

Railway, Iowa, Chicago, Milwaukee, St. Paul & Pacific R.R. Co., Chicago, Ill., to John Marsch, Inc., Chicago, Ill., est. $1,000,000.

Office, Toronto, Ont., Eight Richmond St. W. Ltd., general contract to Simcoe Constr. Co. Ltd., Toronto, est. $1,000,000.

Plant, South Charleston, W. Va., Westwaco Chlorine Products Inc., to H. K. Ferguson Co., Cleveland, O., est. $1,000,000.

Office, Chicago, Ill., Loebel, Schlossman & De Muth, archts., Chicago, general contract to R. C. Nieboldt Co., Chicago, for J. R. Thompson, est. $1,000,004.

Hotel, Atlantic City, N. J., Boardwalk Hotels Corp., to Day & Zimmerman, Phila., Pa., est. $1,000,000.

Construction News of the Week

WATERWORKS

Proposed Work

Calif., Hayward—District to be organized to finance water supply for towns in Eden Twps. To exceed $25,000.

Ga., Griffin—City, 3 m. g. filtration plant, 9 mi. 16- to 20-in. pipe lines. $350,000. Robert & Co., Bona Allen Bldg., Atlanta, engrs. Noted June 6.

Ill., Urbana—University of Illinois, house with equipment, new deep wells, filtration plant, on campus. $250,000. J. M. White, Administration Bldg., superv. archt.

Ill., Wood River—City, will not build pumping station, pumps, tank on tower, reservoir, mains, $40,000-$72,000. Project abandoned. Noted June 6.

Ia., Ft. Dodge—City Waterworks, L. C. Pray, supt., bids in August, improving waterworks, incl. 4 m.g. iron removal plant. $175,000. C. H. Reynolds, City Hall, engr.

Kan., Ft. Scott—City purchasing, installing booster pump at Stand Towers, $15,000. F. Hawthorne, City Hall, engr.

Mich., Adrian—City water-works, incl. 1,000 ft. 16 in. c.i. supply line, 5,000 ft. 10- to 16-in. c.i. distributing lines, pump house with 125 ft. chimney, 1 flow meter, motors, generators. A. H. Smith & Niles Co., 1521 Nicholas Bldg., Toledo, O., engrs.

Mich., Pontiac—Oakland Co. 6,900 ft. 6 and 8 in. c.i. mains, also 62,000 sq.ft. concrete sidewalk in Southfield Twp. $25,000. B. Buchanan, 300 Lafayette Bldg., Detroit, engr.

Mont., Glendive—Purchase one each 40,000 gal. high, 80,000 gal. low duty pump; install 1,800 ft. 10 in. c.i. mains. C. W. Eyer, city engr.

N. J., East Brunswick (mail New Brunswick)—Township Comm., Town Hall, mains, valves, hydrants in 20 streets. $120,000. R. P. Wilson, 46 Paterson St., New Brunswick, engr. Noted Oct. 18, 1928.

Okla., Hartshorne—Extending waterworks. $15,000. J. S. Johnson, Hartshorne, engr.

Okla., Oklahoma City—Water mains. $115,000. W. W. Small, City Hall, engr.

Tex., LaPorte — Waterworks addition, extending distributing system, pumping equipment. Address F. Reynolds, mayor.

Tex., San Antonio—Woodmere Park Co., c/o L. S. Karren, Karren-Tobias Lumber Co., 1919 South Flores St., waterworks distribution system in 100 care subdivision in Woodlawn addition. Private plans.

Wash., Everett—Soon takes bids muncipal waterworks. $1,000,000. J. O. Baar, consult. engr. Noted Jan. 24.

Wash., Seattle—City Council plans expending $175,000, new Cedar Falls Pipe Line using steel and wood pipe.

THESE reports are grouped under each class (water-works, sewers, etc.) and under each stage of the work (proposed, bids asked, etc.) according to the alphabetical order of states.

Where name of official is not given inquiries should be addressed to City Clerk, County Clerk, or corresponding official.

Ont., Hamilton — Council, extending mains. $160,000. W. L. McFaul, City Hall, engr.

Ont., Nepean—Nepean Twp. retained James, Proctor & Redfern, engrs., 36 Toronto St., Toronto, waterworks, incl. c.i. distribution mains, valves, hydrants, house connections. $25,000.

Bids Asked

Fla., Hollywood—Aug. 15, by C. E. Burgon, city mgr., reservoir, pumping station, settling basins, filters, buildings, 4 mi. 8- to 12-in. c.i. mains. $28,000. Gilbert C. White Co., 406 Main St., Durham, N. C., engrs.

Kan., Ft. Scott—City Clerk, bids about Aug. 5, booster pump, equipment for waterwords. $15,000. F. Hawthorne, City Hall, engr.

Ky., Fulton—Aug. 5, by City Clerk, waterworks improvements and additions. $15,000. Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., engrs.

La., St. Bernard—Aug. 6, by Police Jury, installing siphon pipe, pumping equipment and pumphouse, on Mississippi River at Poydras. A. M. Blamphin, New Orleans, engr.

Md., Baltimore — Aug. 6, by Bd. Awards, mains in Tioga Parkway and Forest Park Ave. E. G. Rost, water engr.

Mass., Hopkinton—Aug. 8, by Water Comrs., Town Hall, 7,500 lin.ft. water mains, erecting 1 story, brick, pumping station. Hydraulic Development Co., 299 Boylston St., Boston, engrs. Noted July 4.

Minn., St. Louis Park—Aug. 7, by village, water mains, hydrants, valves. Alexander & Bradley, 417 New York Life Bldg., Minneapolis, engrs. $15,000.

Miss., Fulton—Aug. 6, by R. E. L. Gillentine, city clk., 425 ft. 8 in., 9,500 ft. 6 in., 4,500 ft. 4 in., c.i. pipe, 10,000 lbs. specials, 100,000 gal. rein.-con. reservoir, 10,560 ft. 8 in., 2,000 ft. 6 in., 2,600 ft. 10 in. sewers, 40 manholes, flush tanks, concrete disposal plant. J. C. Lawson, City Hall, engr.

Miss., West Point—Aug. 7, by City clerk, oil engines for water and light plant. Burns & McDonnell, Eng. Co., 402 Interstate Bldg., Kansas City, Mo., engrs. Noted July 24.

Neb., Madrid—Aug. 8, by L. P. Guildner, clk., 35,000-40,000 or 50,000 gal. tank on tower, 108 ft. 8 in., 1,900 ft. 6 in., 10,675 ft. 4 in. c.i. pipe, 2,900 ft. 2 in. c.i. or galvanized pipe, hydrants, valves, boxes, 6 in. tubular well, 150 ft. deep, 50 g.p.m. pump and motor. $20,700. Henningson Engr. Co., 326 Union State Bank Bldg., Omaha, engrs.

N. J., Newark—Aug. 20, by North Jersey Dist. Water Supply Comn., 24 Commerce St., furnishing and installing pumping and electrical equipment for headworks of Wanaque Aqueduct at Wanaque Dam, Passaic Co. M. R. Sherrerd, consult. engr. Fuller & McClintock, engrs. Adv. E.N.-R. Aug. 1.

N. Y., Ogdensburg—Aug. 6, by Bd. P. Control, Pumping Station, constructing pipe line to be suspended on Spring Street Bridge and on shore. Hazen & Everett, 25 West 42nd St., New York, engrs. C. H. Lord, controlling engr.; adv. E. N.-R. Aug. 1.

See proposal advertising on page 145

Constr. News page 55

LEADITE

Trade Mark Registered U.S. Pat. Office

150 Miles of Water Mains Jointed with LEADITE

Washington Suburban Sanitary District, Hyattsville, Md.—of which Mr. R. B. Morse is the Chief Engineer, have laid more than 150 miles of cast iron water mains with LEADITE joints—sizes up to and including 24"—pressures up to 150 pounds per square inch. They use LEADITE exclusively for jointing their water mains—with excellent results.

Many years' experience has proven that on thousands of miles of water mains (of various sizes, and for various pressures) laid under all conditions,—LEADITE not only makes extremely tight joints, but withstands vibrations,—does not corrode or rust,—resists electrolysis,—eliminates caulking,—and reduces the cost of digging bell holes. In addition, the use of LEADITE "speeds up completion of the job, thus saving large sums in interest charges, and making the water line a revenue producer in a shorter time."

The pioneer self-caulking material for c. i. pipe.
Tested and used for over 30 years.
"Saves at least 75%"

THE LEADITE COMPANY
Land Title Building - - Philadelphia, Pa.

No Caulking

Waterworks (Continued)

N. Y., Oxford—Aug. 15, by Bd. Water Comrs., improving waterworks system. H. W. Taylor, 11 Park Pl., New York, engr.; adv. E. N.-R. Aug. 1.

N. C., Newton—Aug. 13, by City, improving waterworks and sewerage systems. Spoon & Lewis, Jefferson Bldg., Greensboro, consult. engrs. Noted July 25.

O., Cincinnati—Aug. 2, by Comrs. Hamilton Co., Water Supply Line 118, Dists. 1 to 8 (inclusive), 71,536 ft. 6- to 12-in. c.i. pipe. $133,286. L. C. Boyatt, Court House, engr.

O., Youngstown—Aug. 27, at office F. A. LaBelle, secy. Bd. Directors Mahoning Valley Sanitary Dist., 901 City Bank Bldg., distributing reservoir, Contr. 21. W. H. Dittoe, Youngstown, ch. engr.; adv. E. N.-R. Aug. 1.

Pa., Phila.—Aug. 6, by Dpt. P. Wks. Bureau Water, A. Murdock, dir., City Hall Annex, 400 standard fire hydrants; 100 flange removable pipe rapid service hydrants; 50 flange removable pipe rapid service hydrant tops, Contr. 961; two hundred 6 in. stop valves, Contr. 962.

Tex., Harlingen—Central Power & Light Co., Frost Bldg., San Antonio, taking bids 1 story filtration plant. $40,000. Hawley & Freese, 411 Capps Bldg., Ft. Worth, engrs.

Contracts Awarded

Ark., Dumas—For 600 ft. well, incl. strainer, pump, motor, 300 g.p.m. pumped to 130 ft. elevated tank, to Layne-Arkansas Co., Stuttgart, $6,175 and $2.50 per ft. for additional footage.

Conn., Hartford—Bd. Water Comrs., 17,000 ft. 42 in., 2,000 ft. 36 in. rein.-con. mains, to Lock Joint Pipe Co., 150 Rutledge Ave., East Orange, N. J., $369,204. Noted July 4.

Ill., Chicago — City, at office Bd. Local Impvts., City Hall, mains in West 56th and West 114th Pls., North Central and Wellington Aves., West 112th, South Elizabeth, South May, South Ada and South Morgan Sts., to G. D. Hardin, 3139 Indiana Ave.; East 96th and 97th Sts., North Harlem, Muskegon, Manistee, Leoti, Tahoma, Sioux and Ionia Aves., to P. J. Collins Co., 5521 Bway.; West 83rd and West 97th Pls., Homewood, North Nevada and Genoa Aves., West 98th, South Green, South Sangamon, South Morgan, Aberdeen Sts., to Walsh & Metzger, Inc., 6828 South Chicago Ave.; Aberdeen and South May Sts., Avenues O and M, Leonard, Birchwood, Clarence, Palatin, Oriole, Colcott, Odell Aves., to Washington Plumbing & Heating Co., 461 North Halsted St.; North Lawndale, Monticello, North Central Park, Drake, North St. Louis, Christiana, and North Ridgeway Aves., to Reliance Plumbing Co., 2430 West Van Buren St.

Ill., Decatur—For 6 in. c.i. mains in South Moreland Pl., to Decatur Contg. Co., Decatur, $12,115. Est. $13,404. Noted July 24.

Kan., Troy — Waterworks, to R. G. Tripp Constr. Co., Herrington, $80,000. Noted Mar. 28.

Mass., Fall River—United Merchants & Manufacturers Co., 103 North Main St., 1 and 2 story, basement, 40 x 100 ft. and 16 x 25 ft., brick, steel filtration plant, plain found., Lewiston St., to S. C. Sperry Co., Inc., 288 Main St., Cambridge.

Mich., Detroit—Bd. Water Comrs., 735 Randolph St., 3 electric motor driven centrifugal pumping units with auxiliary equipment, to Byron Jackson Co., Sharon Bldg., San Francisco, Calif., $25,812. Noted June 13.

Mich., Detroit—Dpt. Water Supply, substructure for filtration plant, Springfield Sta., to W. E. Wood Co., Union Trust Bldg., $1,572,898. Noted July 25.

O. Cleveland—Cuyahoga Co., main in Westwood Ave., Impvt. 657, to Essi & Haddad, 2196 West 100th St. $49,822.

Tex., Riogrande—Central Power & Light Co., Frost Bldg., San Antonio, filtration plant, intake pump unit, to L. S. Vallely & Co., Inc., 2nd Natl. Bank Bldg., Houston filter equipment, to International Filter Co., 333 West 25th Pl., Chicago, Ill. Total est. $45,000. Noted July 25.

Ont., Toronto—Water tank, steel, Avenue Rd. and Roselawn Ave., to Horton Steel Wks., Ltd., Northern Ontario Bldg., $35,700.

SEWERS

Proposed Work

Ark., Hot Springs — Preliminary plans one 3 m.g. and one 500,000 gal. sewage disposal plants, $192,600. H. S. Moreland, Como Bldg., engr.

Calif., Berkeley—Preliminary plans sewer in Marin Ave. between Tulare and San Pablo Aves., $250,000. H. Goodridge, acting city engr.

Calif., Burlingame—City, plans 13,200 ft. 6- to 24-in. vitrified sewers, 70 manholes in Easton addition. C. M. Thomas, city engr. Noted May 9.

Calif., Huntington Park—Storm drain system for flood waters, $150,000. H. McCurdy, City Hall, engr.

Ill., Hillsboro—Bd. Local Impvts., received no bids July 8, 6,806 ft. 8-to-12-in. sewers, 21 manholes, 7 lampholes in Sewer Dist. 3. Will re-advertise. O. M. Hampton, city clk.

Ia., Ottumwa—Soon takes bids 12,947 ft. 10- to 10-in. standard salt glazed vitr. sewers, $30,248 W. C. Wyman, City Hall, engr.

Mo., S. Louis—Bd. P. Serv., City Hall, soon takes bids improving sewers in Clifton-Dale Dist., $3,750; Hamilton Avenue Joint Sewer, Harlem Creek Sewer 26, $7,750; Manchester Avenue Sewer 3, $6,500; South Hurst Sewer 2, Southwestern Sewers 1, $56,799; Southwestern Sewers 2, $17,500. W. W. Horner, city engr. Noted May 9.

Nev., Reno—Intercepting sewerage system, sewage disposal plant, $300,000. C. C. Kennedy, Call Bldg., San Francisco, Calif., engr. Noted Apr. 16.

N. J., Bradley Beach—Bd. Boro Comrs., reconstructing sewerage system with new septic tanks, $130,000; two new buildings, $20,000. N. Rogers, Asbury Park, engr. Noted Nov. 22, 1928.

N. J., Hillside—Township Comr., Town Hall, preliminary plans sanitary storm sewers in Lehigh Valley Industrial Tract, $225,000. A. W. Potter, 50 Church St., New York, consult. engr.

N. J., Jersey City—Bd. Comrs., City Hall, constructing sewerage system in Carteret and adjoining streets, $100,000. C. A. Van Keuren, city engr.

N. J., Newark—Bd. City Comrs., City Hall, preliminary plans system of sewers known as Avenue P sewers and Branches Sect. 1, $50,000. J. Costello, city engr

N. J., Ridgefield—Bd. Boro Council new sewage disposal plant, $50,000. McClave & McClave, 600 Gorge Rd., Cliffside, boro engrs.

O., Brooklyn (br. Cleveland)—Village main trunk, outlet sewers. R. Hecker, Leader Bldg., Cleveland, engr.

Okla., Henryetta—City preliminary plans sanitary sewerage in 60 blocks. $25,000. T. J Enbrie, Henryetta, engr.

Okla., Lawton—Preliminary plans 10,500 ft. 24 and 36 in. concrete sewers in business section, $50,000. F. E. Lawrence, Lawton, engr.

S. D., Hebron—Sanitary sewerage system $30,000. F. Conrath, city aud.

Tex., San Antonio—Woodmere Park Co., c/o L. S. Karren, Karren-Tobias Lumber Co., 1919 South Flores St., sewerage system in 100 acre subdivision, Woodlawn Section. Private plans.

Utah, St. George—Sewers in 23 blocks, $39,143. L. Snow, city engr.

W. Va., Charleston—City Council soon takes bids 18 and 24 in. sewers in 24th St. and 1st Ave. $49,924. A. B. Maupin, Huntington, engr.

N. B. Dalhousie—Town sewerage system, $160,000. F. B. Swinnard, town clk

Ont., Sudbury—Council, sewers. $150,000. S. A. Purvis, Town Hall, engr.

Ont., Toronto—York Twp., 1,950 lin.ft. vitr. tile sewers in Stratheam Rd. $36,650. F. B. Goedike, 40 Jarvis St., engr.

Ont., Sudbury—Town, 12- to 30-in. storm sewers, 1,000 ft. tunnel, pumping station, force main. $140,000. S. A. Purvis, Sudbury, engr.

Ont., Woodstock—City, glass covered sewage disposal beds in connection with sewage disposal plant. $25,000. W. Ure, 9 Perry St., engr.

Bids Asked

Conn., New Haven—Aug. 2 by City, 3,000 ft. 10 in. c.i. force main sewers, 3 story, 18 x 16 ft. pump house with equipment. E. Nettleton, City Hall, engr.

Ill., Chicago—Aug. 2, by City at office Bd. Local Impvts., City Hall, tile pipe sewers, brick manholes, catch basins in West 129th Pl., Blue Island Rd., South Peoria, South Morgan, South Sangamon and South Green Sts., Albion, Lamon, Greenwood and Layola Aves. M. J. Faherty, pres.

Md., Baltimore—Aug. 6, by Bd. Awards, sewers and storm drains in Storm Water Contr. 135, M. J. Ruark, Municipal Bldg., sewerage engr.

Mass., Boston—Aug. 6, by Dpt. P. Wks., sewerage system in Brighton, Aug. 9, in Dorchester. $25,000. J. H. Sullivan, comr. Dpt. P. Wks.

Miss., Cleveland—See "Power Plants."

Miss., Fulton—See "Waterworks."

Mo., St. Louis—See "Streets and Roads."

N. Y., Buffalo—Dpt. P. Wks., Municipal Bldg., takes bids about Sept. 19, Hertel Avenue Drain. Former bids rejected. Noted June 6.

N. Y., Harrison—Aug. 9, by Westchester County Sanitary Sewer Comn., 192 Martine Ave., White Plains, sewer along or near Mamaroneck River, easterly from point 200 ft. below Winfield Ave. Adv. E.N.-R. Aug. 1.

N. Y., Hudson—Aug. 12, at Executive Dpt., Div. Standards & Purchase, Capitol, Albany, sewers, water lines and incidental work, by Training School for Girls; adv. E. N.-R. Aug. 1.

N. Y., New York—Aug. 8, by H. Bruckner, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., sewers in Country Club Rd., Campbell Dr., Polo, Libby and Agar Pls., Fish, Seton, Buhre, Oxford Aves., West 236th, West 238th Sts.

N. C., Newton—See "Waterworks."

O., Beechwood (br. Cleveland)—Aug. 5, by Village, storm, sanitary sewers in Wimbledon, Sulgrave, South Woodland, Richmond, Hazelmere, Duffield, Crafton and Brucefield Rds. C. W. Courtney, East 11th St. and Walnut Ave., Cleveland, engr.

O., Cleveland—Aug. 5, by Bd. Comrs., Cuyohoga Co., 8,400 ft. 15- to 60-in. sewers in Brookpark and Stumpf Roads. W. J. Rogers, Ulmer Bldg., engr. Noted July 25.

O., Toledo—Aug. 21, at office W. H. Schroeder, dir. P. Serv., 308 Safety Bldg., Bay View Park Sewage Treatment Works, Contr. 21. Noted July 11. Former bids rejected; adv. E.N.-R. Aug. 1.

Contracts Awarded

Calif., Gridley—Sanitary sewerage system, to Mathews Constr. Co., Forum Bldg., Sacramento, $38,090.

Calif., Los Angeles—Sanitary sewers in Hill Dr. and Loleta Ave., to J. Chutuk, Wilcox Bldg., $38,120. Noted July 25.

Conn., Greenwich—Sewers in Dists. 3 and 4 in Cos Cob, to A. Fastiggi, 62 Chestnut St., Montclair, N. J., $431,345. Noted July 11.

Ill., Decatur—Storm and sanitary sewers in South Moreland Pl., to Decatur Contg., Decatur, $37,350. Noted July 11

Kan., Troy—Sanitary sewers, to R. S. Tripp Constr. Co., Herrington, $65,000. Noted Apr. 4.

Md., Baltimore—Mayor and City Council, manholes and handbox covers, to American Brake & Shoe Fdry. Co., Fulton Station, $39,920.

Mich., Flint—City, East Side Intercepter Sewer, 10,126 ft. 42- to 61-in. precast concrete pipe, 3 barreled inverted syphon, 16, 20 and 24 in. concrete pipe, to Heitech & Bitten, 186 Bagley Ave., Pontiac, $180,461; Beechwood Park Sewer, 11,490 ft. 12- to 66-in. concrete pipe, to J. R. Matson Co., Grand Rapids, $51,923. Noted July 4

Mich., Grosse Pointe—Village, Fox Creek covered drain and interceptor sewer to S. A. Healy, 6561 East Seven Mile Rd., Detroit, $415,093. Noted July 18.

Mass., Milton (br. Boston)—Metropolitan Dist. Comn., 3,570 ft. 72 x 75 in. concrete sewer in Blue Hills Parkway, to V. Barletta, 10 Whipple Ave., Roslindale, $99,040.

Mich., Mt. Clemens—Macomb Co., Mound Park Drain, 39,700 ft. vitr. and rein.-con. sewers, to Waterway Constr. Co., Sherwood St. and Rinke Rd., Detroit, $102,653. Noted July 11.

Minn., LeSueur—See Streets and Roads."

N. Y., Brooklyn—J. J. Byrne, pres. Brooklyn Boro, Boro Hall, sewer Barbey St. and Tilden Ave., to S. Guerriero Co., 1024 66th St., 74.49% est. $32,735 and 64.98% est. $24,913 respectively; East 43rd St. and Lenox Rd., to Vacaro & Fornaro, 64.31% est. $6,152 and 67.39% est. $8,038 respectively; Lenox Rd., to R. Nazzarro, Inc., 1550 62nd St., 70.75% est. $3,604; Nassau Ave., to Ferbon Constr. Co., 94% est. $6,768. Noted July 4.

O., Akron—F. E. S. Swineford, Dir. Pub. Serv., 7,245 ft. segmental block sewers in Evans Ave. et al. to F. George, 1657 Mahoning Ave., Youngstown, $46,523. Est. $74,000.

O., Cleveland—Sewers in 5 avenues and 1 street, to Sewer Constr. Constr. Co., Fidelity Bldg., $11,846—East 33rd St., to J. Winterbottom, 15703 Lake Ave., $4,130—Archmere Ave., to E. P. Langenhan Constr. Co., Marshall Bldg., $3,041—East 155th St., to Amato Constr. Co., 12508 Union Ave.

O., Columbus—W. H. Duffy, dir. Service, sanitary sewers in Brookwood, North and 19th Sts., to B. Canini, 297 South High St., $23,116.

O., Dayton—Sanitary sewer siphon under Miami River below Stewart St., to L. Wiley, Crescent Dr., $32,199.

Pa., Phila.—Dpt. P. Wks., Bureau Engineering & Surveys, branch sewer in Allens Lane, to E. Ventresco, 6016 Ross St., $10,868; Dorset St., to Leva Bros., 104 West Gale St., $6,127; main sewers in Little Tacony Creek and Mansfield St., to O'Neill Constr. Co., 6 West Willow Grove Ave., $60,385, and $14,000 respectively. Grand total $91,380. Noted July 4.

WASTE DISPOSAL

Proposed Work

N. J., Westwood—Bd. Boro Council, Boro Hall, preliminary plans incinerator plant to burn 30 tons refuse in 24 hrs. $40,000. Hering & Westphal, 261 Bway., boro engrs

O., East Cleveland—City, 30 x 45 ft., rubbish destroyer, to Nye Odorless Incinerator Co., Inc., 50 East 42nd St., New York, $22,500.

Que., Montreal—City incinerator in St. Gabriel's Ward, $500,000.

BRIDGES

Proposed Work

Calif., Long Beach—Rein.-con. viaduct over Pacific Electric Ry., Hill St. and Orange Viaduct. A. H. Adams, City Hall, engr.

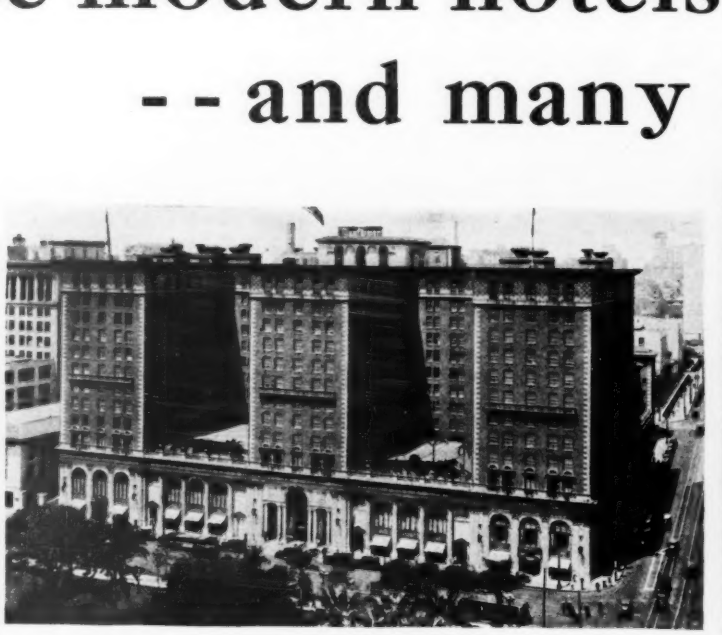
Calif., Los Angeles—Rein.-con. bridge over Los Angeles River, on Colfax St., M. Butler, City Hall, engr.

Ill., Joliet—City and Illinois Div. Waterways, Springfield, surveys new bridge over Illinois River, on Ruby St. $32,000. L. D. Cornish, Div. Waterways, Springfield, engr.

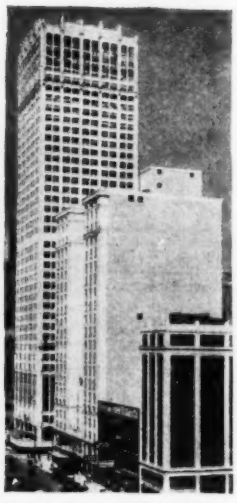
Constr. News page 56

These modern hotels --and many more

The Sherry-Netherland—*New York*

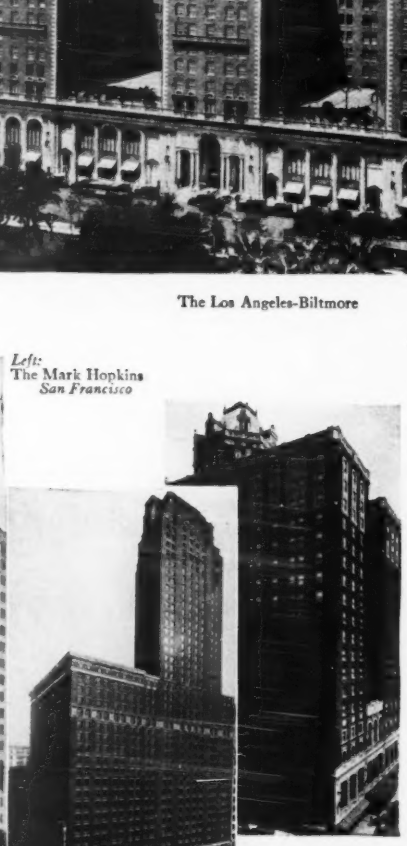


The Los Angeles-Biltmore



Barlum Hotel and Tower—*Detroit*

Left:
The Mark Hopkins
San Francisco



Above:
The Lord Baltimore
Baltimore

Above:
The Morrison
Chicago

Left:
The Manger
New York

Hotels in every important city of the United States and many foreign countries have Bethlehem Wide-Flange Structural Shapes—generally known as Bethlehem Sections—in their steel framework.

Bethlehem Sections are likewise being extensively used in the framework of industrial buildings, bridges, hangars, apartments, theatres, office and bank buildings, public buildings, and numerous other structures. Architects, engineers and contractors the world over have long recognized the light weight and the economy in cost of fabrication of these Wide-Flange Shapes.

With the introduction, about one year ago, of 33- and 36-inch Sections, Bethlehem further broadened the service of a famous series of shapes. Bethlehem Wide-Flange Structural Shapes—H-Columns, I-Beams and Girder Beams—are being rolled in all popular sizes on regular schedule at the Bethlehem, Pa., and Lackawanna, N. Y., Plants.

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Bethlehem Steel Export Corporation, New York City
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BETHLEHEM
WIDE-FLANGE STRUCTURAL SHAPES

Bridges (Continued)

Kan., Fort Scott—City, Bourbon Co., and Missouri Pacific R.R. Co., E. A. Hadley, ch. engr., Missouri Pacific Bldg., St. Louis, Mo., and Missouri, Kansas, Texas R.R. Co., F. Ringer, ch. engr., St. Louis, Mo., rein.-con. viaduct over Marmaton River and tracks of Missouri Pacific and Missouri, Kansas & Texas R.Rs. $300,000. Marsh Eng. Co., 205 Masonic Temple, Des Moines, Ia., engrs.

Ky., Louisville—Kentucky & Indiana Terminal R.R. Co., W. S. Campbell, 30th and Bank Sts., preliminary plans viaduct, 31st and Magazine Sts., other grade elimination work. $300,000.

La., New Orleans—Repairing bridge over Bayou St. John $50,000, constructing new bridge $200,000, temporary bridge $28,000 Replacing drawbridge with stationary arched bridge. D. W. Godat, City Hall, engr.

Mo., St. Louis—City and Wabash Ry. Co., M. F. Longwill, ch. engr., Ry. Exch. Bldg., soon take bids 120 ft. rein.-con., steel, double track railroad bridge over Kingshighway Northwest, near West Florissant Ave. $52,000. City to pay $22,000 toward cost. Noted June 20.

Okla., Dougherty—Murray Co. (Sulphur) preliminary plans steel truss bridge over Rock Creek, near here. $35,000. A. O. Walker, Sulphur, engr.

Okla., Eldon—State Hy. Dept., Oklahoma City, preliminary plans 3 span 300 ft. steel truss bridge on piers over Barron Fork, Hy. 51, near here. Cherokee Co. $60,000. J. Rightmire, Oklahoma City, engr.

Okla., Elmer—State Hy. Dept., Oklahoma City, Okla. and State Hy. Dept., Austin, Tex., 700 ft. pile trestle bridge over Red River, near here, Jackson Co., $65,000. J. Rightmire, Oklahoma City, engr.

Okla., Mangum—State Hy. Dept., Oklahoma City, preliminary plans 18 span 250 ft. pile trestle bridge over Salt Fork River, Greer Co. $30,000. J. Rightmire, acting hy. engr.

Okla., Tulsa—Preliminary plans bridge across Arkansas River, on South 21st St. K. R. Ties, Tulsa, engr. $400,000.

Ont., Chatham—City Council, bridge, 3rd St. $50,000. A. L. Thompson, City Hall, engr

Ont., Kitchener—Wellington and Waterloo Counties, bridge, either 200 ft. span with abutments or two 100 ft. span abutments and pier, on county line between Waterloo and Wellington Counties. $30,000. L. S. Lichty, Court House, engr.

Que., Quebec City—Provincial Govt. Quebec soon takes bids reconstructing 162 bridges.

Bids Asked

Alabama—Aug. 13, by State Hy. Dpt., Montgomery, several small concrete bridges on hys. in Etowah, Lamar, Colbert and Tuscaloosa Counties. W. Finnell, hy. dir.

Arkansas—Aug. 15, by State Hy. Comn., Little Rock, 2,500 ft. steel and rein.-con. bridge over Ouachita River on El Dorado-Calion Rd., State Hy. 115, Sects. 1 and 2, Union and Calhoun Counties; adv. E. N.-R. Aug. 1.

Conn., Darien—Aug. 9, by Superintendent of Highways and Bridges, Town Hall, reconstructing Rings End Bridge. Adv. E.N.-R. Aug. 1.

Ind., Indianapolis—Aug. 5, by Bd. Comrs. Marion Co., constructing Pike Twp. Bridge 19. $25,000. H. Dunn, aud.

Ind., Noblesville—Aug. 6, by Bd. Comrs. Hamilton Co., Paulsel, McDonald and Lafayette Rd. Bridges. $60,000. O. M. Applegate, co. aud.

Ind., Wabash—Aug. 6, by Bd. Comrs. Wabash Co. constructing, repairing bridges in Pleasant, Paw Paw, Chester, Liberty and Waltz Twps. $60,000. Q. A. Carver, co. aud.

Iowa—Aug. 6, by State Hy. Comn., Ames, raising 32 x 22 ft. I-beam bridge, also 3 culverts, extensions, U. S. Rd. 71, F. A. B. 52, Audubon Co.—three 40 x 24 ft. and two 32 x 24 ft. I-beam spans, 9 culverts, extensions, U. S. Rd. 30, B-630, Boone Co.—40 x 24 ft. I-beam bridge, 4 culverts, Rd. 25, B-52, Guthrie Co.—relocating 40 ft. concrete arch bridge, 6 culverts, U. S. Rd. 30, B-563, Harrison Co.—90 x 20 ft. pony truss bridge, Rd. 161, F. A. B. 224, Linn Co.—2 box culverts, Rd. 76, F. A. B. 53, Louisa Co.—60 x 18 ft. pony truss bridge, 7 box culverts, New Haven Rd., B-628, Mitchell Co.—140 x 20 ft. high truss bridge, 4 box culverts, U. S. Rd. 71, F. A. B. 238, 90 x 20 ft. skew truss bridge, 11 box culverts, Rd. 120, B-618, and 1 box culvert, U. S. Rd. 34, B-575, Montgomery Co.—three 50 x 24 ft. I-beam span overhead crossing, Rd. 7, B-576, 120 x 20 ft. skew high truss bridge with two 40 x 20 ft. I-beam approaches, Rd. 83, B-631, raising 28 x 24 ft. I-beam approaches to multiple beam span, Rd. 7, B-298, Pottawattamie Co.—2 culvert extensions, Rd. 7, F. A. B. 207, Shelby Co.—8 box culverts, U. S. Rd. 34, F. A. B. 83, Union Co.—3 box culverts, U. S. Rd. 55, B-177, Winneshiek Co. R. F. White, hy. comr.

Mass., Beverly—Aug. 6, by Comrs. Essex Co., R. H. Mitchll, chn., concrete and steel drawbridge over Bass River. Est. exceeds $25,000. R. Evans, Beverly, co. engr. Noted June 27.

Mich., Sandusky—Aug. 7, at Road Office Sanilac Co., S. R. Bridge 1 of 74-15-20C-1 and 2, two 65 ft. spans. E. R. Benkert, Pt. Huron, resident engr.

Miss., Magnolia—Aug. 5, by Bd. Supervs. Pike Co., Turner Bridge, 4th Dist., Sam I. Simmons Bridge, 1st Dist., Cross Roads, Bucksport, Bogden Place, Bud Wyatt, Albritton and Dry Creek Bridges, 3rd Dist.

N. Y., White Plains—Aug. 13, by Westchester Co. Park Comn., 72 West Pondfield Rd., Bronxville, stone faced rein.-con. bridge Lake St., Central Westchester Parkway. L. G. Holleran, Bronxville, acting ch. engr.; adv. E. N.-R. Aug. 1.

Mont., Hamilton—Aug. 6, by Ravelli Co., 160 ft. span bridge on concrete piers over south fork of west fork Bitter Root River, near Fox Saw Mill.

Oklahoma—Aug. 20, by State Hy. Dpt., Oklahoma City, concrete bridge over Boggy Creek, north of Stringtown, Atoka Co.; and north of Ardmore on U. S. Hy. 77, Carter Co. J. Rightmire, Capitol, Oklahoma City, engr.

Vermont—Aug. 2, by State Hy. Bd., Montpelier, new abutments and approaches, 77 ft. steel truss bridge over Cold River, Clarendon.

Washington—See "Streets and Roads."

Contracts Awarded

Arkansas—State Hy. Comn., Little Rock, concrete bridges in Boone Co., to Maxwell Constr. Co., Columbus, Kan. $29,229—Yell Co., to Williamson & Williams, Batesville, $34,712—Union and Ashley Counties, to Gauger-Korsmo Constr. Co., Memphis, Tenn. $452,515—Miller and Lafayette Counties, to Kansas City Bridge Co., 510 Orear-Leslie Bldg., Kansas City, Mo. $448,162. Grand total $964,618. Noted July 11.

California—State Hy. Comn., Sacramento, rein.-con. girder bridge across Arcade Creek, 11 mi. east of Sacramento, Sacramento Co., to G. J. Ulrich Constr. Co., Modesto, Calif., $13,132. Noted July 25.

Louisiana—State Hy. Comn., Baton Rouge, 300 ft. creosoted pile timber trestle over Bayou Sauvage, widening approaches to bridge over industrial canal, Project 4501, Orleans Parish, to Hemingway & Ware, Gulfport, Miss., $28,893. Noted June 13.

Miss., Vicksburg—Bd. Supervs. Warren Co., bridge over Yazoo & Mississippi Valley R.R., south end Washington St., to Badgett Constr. Co., Cedar Bluff, Ia., $71,261. Noted June 27.

Missouri — State Hy. Comn., Jefferson City, to M. Haase, St. Joseph, bridges over Muddy Creek, $27,099; West Medicine Creek, $14,153; Wild Cat Creek, $9,898; Little Medicine Creek, $6,928; Burries Creek, $4,316, all Mercer Co.—to Zeigler Bros., Greensboro, N. C., Vernon Co., $4,086—to O. O. Fuller, Nevada, Dry Branch, $2,045; at Station 11944 plus 76, $996; Station 1209 plus 72, $526; over Muddy Fork Spring River, $21,477, all Barton Co.; Vernon Co., $4,322—to G. W. Condon, Omaha, Neb., over Grand River Overflow, $3,927; Wakenda Overflow, $10,114; at Station 144 plus 00, $4,513; Station 142 plus 00, $8,566, all Carroll Co.; over South Fork Muddy Creek, $8,408; North Fork Muddy Creek, $3,325, both Nodaway Co.—to Garrett Constr. Co., Springfield, Snider Hollow, $6,914; Evans Hollow, $8,690; Little Pike Creek, $17,401, all Cater Co.; over ditch, $1,537; over Pomme de Terre River, $25,785, Polk Co.; over Dry Wash, $3,126; east fork Birch Creek, $3,408; west fork Birch Creek, $4,668; over creek, $2,569, Shannon Co.—to Pope Constr. Co., Jefferson City, over Scattering Branch, $8,921; over Hamilton Branch, $4,881, Audrain Co.—to Clark, Kearney & Stark, Louisiana, over Burbridge Creek, $7,471; over Lick Creek, $24,949, Ralls Co.—to M. E. Gilliox, Monett, over Moreau River, $44,471 over Moreau River Overflow, $17,496, Cole Co.; over Lautre Slough, $9,296; over Missouri, Kansas & Texas R.R. tracks, $17,524; Lautre Ditch, $26,535, Montgomery Co.—to Gaines Bros. Co., Fairland, Okla., Elm Creek, $6,777; over Hooks Creek, $5,495, Schuyler Co.—to J. H. Miller & Son, Bethany, over Third Fork of Platte River, $11,305 over Elm Grove Branch, $7,418, Gentry Co.—to Carte-Harlin Constr. Co., West Plains, Texas Co. $4,820—to J. R. L. Williams, Charleston, Mississippi Co. $7,348—to A. P. Munsen, Marion, Ia., Carroll Co. $7,141—to Rand-Miller Constr. Co., Kansas City, Johnson Co. $6,995—to Kelly & Underwood, Granby, Oregon Co., $9,141—to McGlone & Walesby, Dearborn, over Smart Creek, $5,080; over Elm Creek, $2,888, Cass Co.—to J. M. Roark & Son, Anderson, over Jones Creek, $12,994; Jenkins Creek, $11,532, Jasper Co. Grand total $469,334. Noted June 20.

New York—A. W. Brandt, comr. Highways, Capitol, Albany (e.e. means engineers' estimate), bridge in Erie Co. to Peckham Constr. Co., Inc., Buffalo, $64,554 e.e. $64,647—in Herkimer Co., to H. J. Ruddy, Inc., 1147 Mohawk St., Utica, $33,452 e.e. $45,314—Tioga St., to Bolton, Suits, & Bolton, & Gibbs, Watkins Glen, $11,475 e.e. $14,438—Livingston Co., to W. A. Greenfield, Hornell, $17,085 e.e. $26,781—in Oswego Co., to Provo Bros., Inc., Syracuse, $26,490 e.e. $34,815—Oneida Co., to J. H. Wills & W. R. Harris, Rushford, $39,868 e.e. $55,444—Herkimer Co., to R. E. Malone, Saranac Lake, $24,610 e.e. $33,191—In Oneida Co., to B. F. McCarey, Rome, $59,138 e.e. $67,454—Clinton Co., to Spellman Oliver Co., Chateaugay, $37,392 e.e. $51,439—Columbia Co., to R. R. Stockman, East Greenwich $7,885 e.e. $9,196—in Chenango Co., to O'Grady, Quilinan, Cohoes, $40,181 e.e. $48,104. Grand total, $362,130. Noted July 4 and 18 under "Streets and Roads."

N. Y., Edinburg—Hudson River Regulating Dist., Albany, Batchellerville Bridge, to Pittsburgh Des Moines Steel Co., 429 Pennsylvania Ave., Pittsburgh, Pa., $491,408. Noted July 4.

N. Y., Sardinia—Bd. Supervs. Erie Co., Buffalo, steel girder deck bridge on Cardinia-Schutts Corners Rd., to Stapell, Munn & Beals, Camp Pl., and Erie R.R., Hamburg, $56,000.

STREETS AND ROADS

Bids Asked

Alabama—Aug. 13, by State Hy. Com., Montgomery, 1,800 ft. earth approaches to bridges in Escambia, Baldwin and Wilcox Counties—7 in. concrete paving 10.5 mi. hy. Colbert Co.—2.5 mi. Monroe Co. E. W. Finnell, hy. dir.

California—Aug. 7, by Directors Joint Hy. Dist. 10, 235 City Hall, San Francisco, grading, 14 mi. oil on 8 in. macadam surfacing 350,000 sq.ft. Juniperro Serra Blvd., San Mateo Co.

Ill., Galesburg—Aug. 5, by Bd. Local Impvt., curbing, guttering, vertical fibre brick paving 5,875 sq.yd. Florence Ave.

Ind., Delphi—Aug. 6, by Bd. Comrs. Carroll Co., grading, graveling highway in Rock Creek Twp., $31,000; grading, gravel and concrete paving Omar Billings et al Hy., Monroe Twp., $26,000.

Ind., Huntington—Aug. 7, by Bd. Comrs. Huntington Co., constructing Julius Martin et al Hy., Huntington Twp. $32,626. C. Griffith, co. aud.

Ind., Noblesville—Aug. 6, by Bd. Comrs. Hamilton Co., grading, gravel paving Marth Eller, East Carmel, T. Paxton Cox, Omar McCain, Ivan Fisher Rds. $25,000. O. M. Applegate, co. aud.

Ind., Paoli—Aug. 5, by Bd. Comrs. Orange Co., constructing 6,820 ft. Mynatt Rd., French Lick Twp. $35,000. W. B. Williams, co. aud.

Ind., Rensselaer—Aug. 5, by Bd. Comrs. Jasper Co., constructing, W. C. Krug et al., stone road between Kankakee and Wheatfield, Twps.; H. C. DeWees et al., road, Newton Twp. $34,000. K. F. Allman, co. aud.

Ind., Spencer—Aug. 6, by Bd. Comrs. Owen Co., improving Otto W. Everly et al Rd., Clay Twp. $26,948. R. H. Evans, co. aud.

Ind., Versailles—Aug. 5, by Bd. Comrs. Ripley Co., macadam paving, John Selke et al Rd., Adams Twp. $25,732. H. L. Akers, co. aud.

Iowa—Aug. 6, by State Hy. Comn., Ames, grading, flumes, paving 123,482 sq.yd. Rd. 32, F.A. 145, Guthrie Co.—64,030 sq.yd. U. S. Rd. 20, P-344-A, Hamilton Co.—grading 10.013 mi. U. S. Rd. 30, Carroll Co.—1.19 mi. Rd. 25, P-52-A, Guthrie Co.—1.207 mi. Rd. 30, P-563-E, Harrison Co.—3.817 mi. Rd. 76, F-53, Louisa Co.—2.501 mi. Rd. 120, P-618, 1.009 mi. U. S. Rd. 34, P-575-B and 1.989 mi. Rd. 71, F.A.P. 238-A and C, Montgomery Co.—8.974 mi. Rd. 12, F.A. 210-C, Plymouth Co.—graveling 8 mi. Rd. 16, P-351, Dallas Co.—8 mi. Rd. 7, P-463, Guthrie Co.—12.6 mi. Rd. 14, P-99, Jasper Co. R. F. White, hy. comr.

Ia., Anamosa—Aug. 7, at office Auditor Jones Co., graveling 1.75 mi. Olin Rd. W. F. S. Yetter, Anamosa, co. engr.

Ia., Charles City—Aug. 3, at office J. H. Curtis, engr. Floyd Co., graveling 2.25 mi. township roads for Rock Grove Twp.

Ia., Knoxville—Aug. 15, at office Auditor Marion Co., graveling 15.49 mi. county and township roads. R. Johnson, Knoxville, co. engr.

Kan., Erie—Aug. 8, by L. R. Stanley, clk, Neosho Co., graveling 10 mi. St. Paul-McCune Co. Rd. C. F. Donald, Court House, engr.

Ky., Henderson—Aug. 7, by Comr. P. Wks., improving Atkinson St. M. D. Ebler, mayor.

La., Bossier City—City taking bids rein.-con. paving Delhi St. from Traffic St. to Hamilton Ave. C. D. Evans, Shreveport, engr.

Maryland—Aug. 6, by State Roads Comn., Baltimore, concrete paving 3 mi. Contr. HO-63, Howard Co.—2.6 mi. Contr. M-127, Montgomery Co.—3 mi. Contr. G-36, Garrett Co.—1.5 mi. Contr. F-127, M-130, Frederick and Montgomery Counties—sheet asphalt paving 0.39 mi. Contr. BC-80, Baltimore Co. H. Williar, Jr., Federal Reserve Bank Bldg., engr.; Adv. E. N.-R. Aug. 1.

Md., Baltimore—Aug. 6, by Bd. Awards, concrete paving 11,000 sq.yd. Contr. 531, N. L. Smith, Municipal Bldg., hys. engr.

Md., Towson—Aug. 6, by Comrs. Baltimore Co., concrete paving 0.4 mi, Group 15—1.06 mi, Group 16—0.25 mi. Group 17. S. A. Green, co. engr.

Massachusetts — Aug. 6, by Dpt. P. Wks., Boston, gravel and bituminous macadam paving 18,870 ft. hys. in Easton, Sharon, Pepperell and West Boylston—bituminous macadam paving 14,471 ft. Groton, Athol and Agawam—bitulithic concrete paving 17,107 ft. Dennis. A. W. Dean, Dpt. P. Wks., engr.

Michigan—Aug. 6, by C. L. Cowgill, resident engr., Plymouth, concrete paving 4.924 mi, Project M063-9C-1 and M063-27C-1, Oakland Co., for State Hy. Dpt., Lansing.

Michigan — Aug. 14, at Council Chambers, City Hall, Marinette, Wis., concrete paving approaches to bridge Project MB1 of 55-7-21C-7, Menominee Co., for State Hy. Comn., Lansing. H. I. Davis, Escanaba, div. engr.

Minn., St. Paul—Aug. 6, by K. L. Fiesseler, city purch. agt., grading, paving center Johnson Parkway between Burns Ave. and East 7th St. $250,000. J. W. Kelsey, city engr

Miss., Batesville—Aug. 12, by Bd. Supervs., graveling 7 mi. River Rd. in Supervisors Dist. 4, Panola Co.

Miss., Holly Springs—Aug. 6, by Supervs. Marshall Co., sand surfacing 10,000 cu.yd. Holly Springs-Hudson Rd., Dists. 1 and 2; 6,030 cu. yd. levee work, 110 ft. pile bridge on levee.

Miss., Indianola—Aug. 12, by Mayor, curbing, paving, sewers, watermains, sidewalks, driveways.

Constr. News page 57

LAYING 84" SEWER PIPE IN EUCLID, OHIO

Laying new trunk sewer at Euclid (Cleveland), Ohio, using 84-in. Independent Concrete Pipe. The second "Independent" Sewer in Euclid!

INDEPENDENT Pipe has been used in constructing many of the largest reinforced concrete pipe sewers in Ohio cities in recent years—and it is going into numerous new storm and sanitary sewer lines this year.

Back of the wide preference for this pipe, not only in Ohio but in a long list of other states, are three important factors:

1. The knowledge that Independent reinforced concrete pipe, manufactured on or near the sewer site by our "factory" methods of production and quality control, makes a most economical and permanent material for sewers.

2. The confidence which engineers and contractors all over the country have in the ability of "INDEPENDENT" to produce pipe of high strength and quality at low cost, and have it ready to lay, on time.

3. The superiority of the "Recessed Joint" —an exclusive feature of INDEPENDENT Pipe, which facilitates laying the sewer and makes possible tighter, stronger joints, even under difficult trench conditions.

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Sales Agencies in All Principal Cities

INDEPENDENT

Reinforced Concrete Pipe

Streets and Roads (Continued)

Miss., Oxford—Aug. 8, by W. C. Trotter, secy. Bldg. Comn., Jackson, sidewalks, 40,000 cu.yd. excavation, for University of Mississippi. F. P. Gates Co., Jackson, engrs.

Miss., Raleigh—Aug. 5, by Hy. Comn., Smith Co., graveling 13 mi. Raleigh-Brandon Hy. J. L. Wheless, Hattiesburg, engr.

Miss., Water Valley—Aug. 5, by Chancery Clerk Yalobusha Co., graveling 5.006 cu.yd. Oakland Public Rd.

Mo., Clayton—Aug. 7, by St. Louis Co. Court House, rein.-con. paving 16,000 sq.yd. Meramec Station Rd., R. Jablonsky, Court House, co. engr.

Mo., St. Louis—Aug. 20, by Bd. P. Serv., City Hall, warrenite paving 8,000 sq.yd. Kingshighway Northwest, $54,200—asphalt paving 7,580 sq.yd. Eichelberger St., $53,560—2,800 sq.yd. Shreve Ave., $23,760—asphaltic concrete paving 1,170 sq.yd. Plateau St., $10,600—1,385 sq.yd. Idaho St., $8,320—840 sq.yd. Clara Pl., $6,480; also 3,250 ft. 8 in. vitr. clay sewer in Southwestern Sewer Dist. 4, $14,160; extending Gasconade Public Outlet Sewer, $7,360. W. W. Horner, city engr.

Nevada—Aug. 7, by State Hy. Comm., Carson City, asphaltic fuel oil surfacing 27.04 mi. Sect. A2, A1, A3, Route 1, Elko Co.

New Hampshire—Aug. 9, by State Hy. Dpt., Concord, 6 in. one course rein.-con. on gravel paving 28,778 sq.yd. Daniel Webster Hy., Hookset, $100,000; 3 in. bituminous macadam on broken stone 3 in. gravel surface course on 6 in. gravel course paving 5.72 mi. Rocky Pond Rd. in Altus and Wolfeboro, $120,000.

N. J., Camden—Aug. 8, by Bd. Freeholders Camden Co., Court House, 9 in. rein.-con. paving Route 42, Sect. 2, Black Horse Pike from Chews Landing to Camden-Gloucester Co. line.

N. J., Jersey City—Aug. 6, by Bd. Comrs., City Hall, opening, widening, sheet asphalt on concrete paving Stevans Ave. $210,000—repaving Summit Ave. $25,000—sheet asphalt on concrete repaving Bway. $25,000—repairing asphalt paving various streets, $150,000. C. A. Van Kenan, City Hall, engr.

N. J., Northvale—Aug. 5, by Bd. Council, Boro Hall, grading, tar penetration macadam paving Phelps Ave., Scherer and Winthrop Sts, $25,000. Herring & Westphal, 261 Bway., Westwood, engr. Noted Apr. 25.

N. Y., Brooklyn—Aug. 7, by J. J. Byrne, pres., Brooklyn Boro, Boro Hall, grading, curbing, flagging Avenue T, East 7th, West 7th Sts., and Remsen, Stanley and Troy Aves.; grading, asphalt on 6 in. concrete paving East 3rd, East 45th, Winthrop Sts., Bushwick, Central, Washington and Flatbush Aves.

N. Y., Buchanan—Aug. 12, by Bd. Village Trustees, paving Tate Ave. and portion Westchester Ave. Hudson Valley Engineering Co., Inc., Halsey Bldg., 906 South St., Peekskill, engr.; adv. E. N.-R. Aug. 1.

N. Y., Buffalo—Aug. 6, by Bd. Supervs. Erie Co., County Hall, rein.-con. paving 0.24 mi. Transit Rd., Pt. 3, G. M. S. 206, G Diehl, Ellicott Sq., co. engr.

N. Y., Long Island City—Aug. 5, by G. U. Harvey, pres. Queens Boro, Queens Subway Bldg., grading, 77th, 55th (2nd), 39th Sts., Liberty, 94th (Graden St.), 18th Aves.; sheet asphalt on concrete paving 91st, Greenpoint, Bayside, Palmetto and Myrtle Aves.; 91st, 46th (Bliss), 92nd Sts.

N. Y., New York—Aug. 8, by H. Bruckner, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., grading, curbing, sidewalks, sheet asphalt on concrete paving Carroll and Bonner Pls., Longfellow Ave. and East 166th St., curbing, sidewalks, granite block on concrete paving West 232nd St.; grading, curbing, sidewalks, East 182nd, Kingsland and Sylvan Aves.

N. Y., Rye—Aug. 7, at office W. H. Selzer, village clk., improving Osborne Rd., J. A. Ehler, village engr. adv. E.N.-R. Aug. 1.

N. Y., St. George—Aug. 7, by J. A. Lynch, pres. Richmond Boro; Boro Hall, bituminous concrete paving Manor Rd., Constant and Forest (Washington) Aves., concrete curbing Richmond Rd.

N. Y., Yorktown Heights—Aug. 14, by E. Tice, town supt. hys., bituminous macadam paving 0.89 mi. Hanover Ave., County Engineer, White Plains, engr.; adv. E. N.-R. Aug. 1.

N. D., Fargo—Aug. 5, by A. R. Watkins, city aud., alternate types paving Northern Pacific Ave. Paving Dist. 208-29, Bway. Paving Dist. 209-29, $30,000.

N. D., Fargo—Aug. 7, by city, curbing, paving, 3rd Ave., 15th and 16th Sts. South, $25,000.

O., Cincinnati—Aug. 6, by C. O. Sherrill, city mgr., City Hall, brick, granite repaving 5,512 ft. Colerain Ave. from West Fork Rd. to Creek Bridge, 40 ft. $124,545.

O., Libson—Comrs. Columbiana Co., bids about Aug. 22, grading 5 mi. North Georgetown Valley-Salem Hy., 18 ft., $60,000-$75,000. L. C. Kirk, engr.

O., Parma (br. Cleveland)—Aug. 2, by Village, sheet asphalt on concrete paving 6 streets.

Oklahoma—Aug. 5, by State Hy. Dpt., Oklahoma City, gravel surfacing 11 mi. U. S. Hy. 77, Carter Co.—12 mi. U. S. Hy. 77, Love Co.—18 mi. U. S. Hy. 75, Atoka Co., all 18 ft., $25,000. J. Rightmire, Capitol, Olkahoma City, engr.

Okla., Boise City—Aug. 5, by J. Bourk, clk., grading, paving 7 blocks 2nd and Cinamon Sts., 26-40 ft. $28,000. H. A. Warner, Amarillo, Tex., engr.

Okla., El Reno—Aug. 5, by E. Dowell, clk., graveling 20 blocks Fair Addition, 24 ft. $26,000. E. W. Fassett, El Reno, engr.

Okla., Holdenville—Aug. 6, by J. Kirk, clk., sheet asphalt resurfacing 5,700 sq.yd. Main St.—concrete paving 3,100 sq.yd. Crawford St.—graveling 6,000 cu.yd. Catalpa St. $37,400. R. Grace, Holdenville, engr.

Pennsylvania—Aug. 15 and 16, by State Dpt. Hys., Harrisburg, grading, rein.-con., vitr. brick, bituminous macadam paving 45 mi. 16 projects in Allegheny, Bedford, Berks, Centre, Clearfield, Franklin, Indiana, Juaniata, Lawrence, Lehigh, Mercer, Montgomery, Somerset and Washington Counties; also nine bridges in Erie, Greene, Juaniata, Lawrence, Northumberland, Perry and Venango Counties; adv. E. N.-R. Aug. 1.

Pa., Butler—Aug. 3, by S. A. Bell, Ferguson's Store, North Washington, grading, centering 2.5 mi. Washington-Hilliard Rd. E. A. Bell, R.D. 3, West Sunbury, secy.

Pa., Meadville — Aug. 13, at Office G. S. Maxwell, city clk., City Hall, curbing, guttering, 12,405 sq.yd. vertical fiber brick on concrete paving. R. L. Phillips, city engr.; adv. E. N.-R. Aug. 1.

Pa., Phila.—Aug. 6, by Dpt. P. Wks., Bureau Hys., A. Murdock, dir. City Hall Annex, grading, asphalt paving (assessment work), a-phalt repaving, asphalt resurfacing (by heater method), Park Area, Easy Driveway of Ben-Salem Ave. branch of Roosevelt Blvd.

Tenn., Knoxville—Aug. 12, by City Manager, concrete paving 12,220 sq.yd. Kingston Pike, $183,000. H. J. Wright, City Hall, engr.

Tex., Caldwell—Aug. 6, by City, c/o C. E. Cromartie, mayor, curbing, guttering, concrete and rock asphalt paving 10,000 sq.yd. $50,000. J. Rady, Waco, engr.

Tex., Moody—Aug. 8, by City, c/o T. P. Money, mayor, grading, curbing, guttering, storm sewers, permanent paving 8,000 sq.yd. $40,000. J. B. McCrary Co., Citizens & Savings Bank Bldg., Atlanta, Ga., engrs. Noted May 23.

Utah—Aug. 6, by State Hy. Comm., grading 6.147 mi., Nolan-Bearer Creek Rd., Carbon Co. H. S. Kerr, Capitol Bldg., Sale Lake City, engr.

Vermont—Aug. 2, by State Hy. Bd., Montpelier, Type B, concrete paving 4.4 mi. Federal Road Project 7-B, Berlin, Barre and East Montpelier.

Virginia—Aug. 13, at office Dpt. Hy., Richmond, concrete paving 1.8 mi. Project 8221-E, Accomac Co.—grading, draining and bridging 2.5 mi. Project F418-AC, Essex Co.—soiling and bridging 4.6 mi. Project 8590-AB, Appomattox Co. Adv. E. N.-R. Aug. 1.

Va., Hillsville—Aug. 7, by Clerk Carroll Co., grading, drainage 2.5 mi. Cliffview Rd.; 3.50 mi. Byllesby Rd., R. E. Cox, Hillsville, co. engr.

Washington—Aug. 13, by S. J. Humes, dir State Hy. Comn., Olympia (**S. R. means State Road**), grading 52,275 cu.yd. S.R.1, Whatcom Co.—72,700 cu.yd. and surfacing 13,140 cu.yd. S.R.14, Federal Aid Project 136-C, Mason Co—grading 25,410 cu.yd., surfacing 1,800 cu.yd. S.R.12, Lewis Co.—Wind Mountain regraveling 10,600 cu.yd. S.R.8, Clark and Skamania Counties—crushed stone surfacing 6,850 cu.yd. Asotin-Oregon State Line Rd., Asotin Co.—bulkhead protection for bridge over Cowlitz River on S.R.1, Lewis Co.—grading, surfacing, bridging 0.4 mi. S.R.12, Pacific Co.—bituminous treated surfacing 32 mi. S.R.2, Lincoln Co.

W. Va., Charlestown — Aug. 6, by Court Kanawha Co., grading, draining, graveling 1.5 mi. Kelly's Creek Rd.

W. Va., Middlebourne—Aug. 13, by Court of Tyler Co., alternate types surfacing, 9 mi. McElroy Creek Rd.; 1.5 mi. Middlebourne-Wick Rd.

Wisconsin—Aug. 6, by State and Waupaca Co. Hy. Comns., Citizens Natl. Bank Bldg., Wisconsin Rapids, grading, concrete surfacing, 4.19 mi. Clintonville-Embarrass Rd.

Wisconsin—Aug. 7, by State, Milwaukee Co. Hy. Comm., Commerce Bldg., Milwaukee, grading, concrete, surfacing 4.57 mi. Milwaukee-Pewaukee Rd.

Wis., Hudson—Aug. 7, by G. R. Hosford, city Clk., curbing, concrete paving, 9,338 sq.yd. $25,000. L. P. Wolff, Globe Bldg., St. Paul, Minn., engr.

Ont., Guelph—See "Contracts Awarded."

Ont., Hamilton—See "Contracts Awarded."

Ont., Kitchener—S. Cassels, clk. Waterloo Co. taking bids widening, macadam and tar macadam resurfacing, $25,000. L. Lichty, Court House, engr. Noted May 9.

Ont., Picton—Aug. 5, by G. Palmsley, clk., Prince Edward Co., grading, stone surfacing, $30,000. E. P Cox, Picton, engr.

Ont., Port Hope—Aug. 5, by M. U. Ferguson, town engr., concrete or asphalt paving 18,000 sq.yd. $50,000.

Ont., Willowdale—Aug. 6 by H. D. Goode, clk. North York Twp., asphaltic concrete on concrete paving 1 mi. Pinewood Ave. $25,000. G. Baker, Willowdale, engr.

Contracts Awarded

Ala., Birmingham—City Comn., to Wesco Co., 4501 2nd Ave. S., 2 in. asphalt surfacing 6 blocks 8th Ave. S., 12th Ave. N., and 4th Ave., $9,627; curbing, guttering, concrete sidewalks, 2 in. asphalt on 6 in. concrete paving 2 blocks 20th St., 46th Pl., 13th Ave. N., $11,685—to Mitchell Bros. Constr. Co., 3828 1st Ave. S., 1 block 40th Court, $4,105—to Fromhold Bros., American-Traders Bldg., 1 block 44th Ave. and 38th Pl. N., $6,526; 2 in. asphalt on 6 in. concrete paving 150 ft. Vanderbilt Rd., 2 blocks 39th Court and Vanderbilt Rd., $10,946—to Southern Roads Co., Pioneer Bldg., 3 blocks 59th St., 8th Terrace S., $14,506—to Reliance Concrete Co., American-Traders Bldg., 6 in. concrete paving 3 blocks 6th Alley S. and 9th Alley N., $3,459; curbing, guttering, sidewalks, 2 in. asphalt on 6 in. concrete paving 2 blocks 38th St. and 12th Court S., $11,708; 2 in. asphalt on 5 in. concrete paving 2 blocks 17th Ave. N. and 21st Pl., $6,781; 2 in. asphalt on 6 in. concrete paving 100 ft. 3rd Ave. S., $1,309—to W. H. Pattie, 2911 North 29th St., 3 blocks 40th Pl. and 43rd Ave. N., $12,099; 2 in. asphalt on 5 in. concrete paving 2 blocks 46th Ave. N., $6,531—to Independent Paving Co., 3828 1st Ave. S., 7 in. concrete paving 8 blocks Vanderbilt Rd., $17,541. Grand total $116,823. Noted July 11.

Arkansas—State Hy. Comn., Little Rock, to O. M. New, Conway, grading 8.5 mi. Clark Co. $49,198—to J. C. Noal & Co., Hermitage, 6 mi. Job 366, Clark Co. $37,488—to D. B. Hill, Little Rock, 7 mi. Johnson Co. $63,024—to Batson Bros., Dardanelle, 10 mi. Franklin Co. $80,386—to Alexandria Contg. Co., Alexandria, La., grading, graveling 6.5 mi. Woodruff Co. $51,830—to M. O. Weaver, Iowa Falls, Ia., gravel and crushed stone surfacing 13 mi. Boone and Newton Counties $32,093—to I. P. Shelby & Co., Little Rock, local graveling 14.5 mi. Columbia Co. $26,087—to M. Tansey, Harrisburg, grading 9 mi. Poinsett Co. $31,595; 14 mi. St. Francis Co., $92,275—to Newell Contg. Co., Little Rock, 5.5 mi. White Co. $25,865; gravel or crushed stone surfacing 17 mi. Van Buren Co. $34,243; asphalt paving 7 mi. Conway and Faulkner Counties $89,137—to Fuller Constr. Co., Dallas, Tex. asphalt paving 9 mi. Craighead Co. $149,888—to L. V. Hites, Des Moines, Ia., concrete paving 5.5 mi. Logan Co. $86,740; 11 mi. Job 877, Logan Co. $177,761. Grand total $1,027,611. Noted July 11.

Ark., Marion—Comrs. Crittenden Co., Court House, grading, graveling, bridging 10 mi. Road Maintenance Dist. 1, to S. K. Jones Constr. Co., Marion.

California—State Hy. Comn., Sacramento, grading, untreated crushed stone paving 1.2 mi. Sacramento Co., to Larson Bros., Sonoma, $75,099—road Lassen Co., to Hein Bros. & Chittenden, Napa, $38,537—4.4 mi. Lassen Co., to Doveri & Co. & J. A. Maddox, Klamath Falls, Ore., $68,213—bituminous surface treating 14.5 mi. Siskiyou Co., to J. Casson, Hayward, $17,877. Grand total $199,726. Noted July 25.

Calif., Burbank—Grading, 8 in. concrete paving 221,818 sq.ft. Edison Blvd. to Oswald Bros., 366 East 58th St., Los Angeles, $50,885. Noted July 25.

Calif., Los Angeles—Improving 3rd and Harper Sts., to Western Roads Co., 2221 East 25th St., $195,557.

Calif., Los Angeles—Grading, curbing, concrete paving 307,682 sq. ft. Gower St., to G. H. Oswald, 366 East 58th St., $100,333; 96,523 sq.ft. Bloomfield St. and Diaz Ave., Impvt. Dist., to J. Tomei, 558 Madison Ave., Culver City, $35,580.

Calif., Los Angeles—Grading, curbing, guttering, concrete paving Burton Way, to Raasch & Pursche Co., 303 North Commercial St., $30,865.

Calif., Los Angeles—Los Angeles Co., grading, concrete paving A. & I. 30, to Griffith Co., Railway Bldg., $237,669. Noted July 25.

Colo., Denver—Dpt. Impvts. & Parks, to M. E. Carlson, 2525 South Downing St., grading, curbing, surfacing South Denver Impvt. Dist. 28, $30,556; concrete paving Alley Paving Dist. 181, $19,408; Alley Paving Dist. 182, $20,468; Alley Paving Dist. 183, $21,597—to Levy Constr. Co., Symes Bldg., asphaltic concrete paving Park Hill Paving Dist. 5, $32,336—to F. M. Perryman, 2161 South Williams St., sidewalks, Washington Park Sidewalk Dist. 4, $24,374. Grand total $148,739. Noted July 18.

Conn., Torrington—For 5 in. macadam penetration trap rock paving Main St., to A. DiBerradino Co., Rocky Hill, $26,586, $25,000.

Conn., Winsted—Waterbound macadam paving 1¼ mi. Winchester Rd., to M. A. Gammino, 728 Valy St., Providence, R. I. Est. $25,000.

Ga., La Grange—Curbing, guttering, concrete paving Harwell Ave., Greenville, Greenwood, Dixie and Fair Sts., to Whitley Constr. Co., La Grange, $71,000.

Ill., East St. Louis—Curbing 7 in. concrete paving 8,340 sq.yd. 79th St., to Keeley Bros. Contg. Co., 4301 State St., $36,188. Est. $37,483.

Ill., St. Joseph—Champaign Co., grading, concrete paving 5.05 mi. Sects. 56-16-D and 56B-15D, State Aid Route, also incl. one 24 ft. and three 45 ft. span rein.-con. girder bridge, to R. McCalman, Inc., Danville, $94,010.

Indiana—J. J. Brown, dir. State Hy. Comn., Indianapolis, concrete paving 7.095 mi. F.A. Project 151-A, Rd. 50, Jennings Co., to Berns Constr. Co., New City Trust Bldg., Indianapolis, $141,305 est. $151,316; 2.191 mi. Project 31-D, Rd. 12, Lake Co., to Sunderman Constr. Co., Gary, $62,643 est. $76,231.

Ind., Anderson—Madison Co., concrete paving 2/16 mi. Locust St., 28 ft., to E. E. Lyst & Co., Anderson, $30,900. Est. $35,000.

Constr. News page 57a

Streets and Roads (Continued)

Ia., Denison—Crawford Co., improving 8.885 mi. Project 232, U. S. Rd. 30, to Carlson Constr. Co., Marshalltown, $210,898.

Ia., Iowa City—Curbing, guttering, 7 in. rein.-con. paving, to W. Horrabin Constr. Co., Iowa City, $27,603.

Ia., Sioux City—F. Thompson, city clk., to Booth & Olsen, Sioux City, concrete paving 4,000 sq.yd. Grandview Blvd., at $1.90 per sq.yd.; 2,000 sq.yd. South Lemon St. $1.65; 8,000 sq.yd. Hamilton and Dearborn Sts. $1.95; 4,000 sq.yd. Jones St. $1.94; to Western Asphalt Paving Co., 2100 East 4th St., 4,600 sq.yd. Victoria Court $1.79; 2,000 sq.yd. Martha St. $1.79—950 yd. 4th Ave., $1.70—to Hanson & Wesley, Sioux City, 1,100 yd. 31st St. $1.93, to Harrington & Jorgenson, Sioux City, 1,820 sq.yd. 25th St. $1.76. Noted June 27.

Ia., Vinton—To Haeg Constr. Co., 105 12th Ave. W., Cedar Rapids, 7 in. rein.-con. paving 12,265 sq.yd. Dists. 1 and 2, at $1.96 per yd., 5,854 ft. curbing at $0.20 per ft., excavating at $0.50 per yd. Noted June 6.

Kan., Concordia—For brick resurfacing, 8,591 sq.yd., to Reed & Wheelock, Clay Center.

Kan., Leavenworth—Leavenworth Co. grading 4.361 mi. road, 30 ft., to J. J. Lamoreaux, 418 Peters Bldg., Omaha, Neb., $59,925.

Kentucky and Indiana—Louisville Bridge Comn., Todd Bldg., Louisville, Ky., W. Black, chn., paving 16,000 sq.yd. roadway and sidewalks of Louisville Free Bridge over Ohio River from Louisville, Ky., to Jeffersonville, Ind., to Yang Constr. Co., 27th and Canal Sts., Louisville, Ky., and Hagerstown, Md., $100,000. Noted Dec. 20, 1928.

Ky., Louisville—Bd. P. Wks., concrete, asphalt, rock asphalt and asphaltic concrete paving new street 6 projects, to G. M. Eady Co., Brook and Lee Sts., $38,179—8 projects, to Henry Bickel Co., 435 Garden St., $50,936—7 projects, to Louisville Asphalt Co., 240 East Lee St., $52,496—5 projects, to Andrews Asphalt Paving Co., Inter-Southern Bldg., $23,244. Grand total $164,856.

Louisiana—State Hy. Comn., Baton Rouge, paving 6.061 mi. Jefferson Davis Parish, and concrete paving 8.5 mi. in Iberia Parish to Moore Bros., New Orleans, $130,599 and $228,348 respectively.

Louisiana—State Hy. Comn., Baton Rouge, to Engineering Constr. Co., Alexandria, 10 mi. embankment on Baton Rouge-New Orleans Airline Hy. between Prairieville and Sorrento, $83,377; grading 10.455 mi. Ascension Parish, $86,377; graveling 16.245 mi. Beauregard Parish, $157,778 to S. B. Boyd, Columbia, Miss., 8.163 mi. Bossier Parish, $56,099—to W. L. Pearson & Co., Edinburg, Tex., concrete paving 14.1 mi. Orleans Parish, $543,580—to Meyer-Greenwald Constr. Co., Monroe, 5.74 mi. St. Mary's Parish, $134,589; 5 mi. Rapides Parish, $123,342—to Tircuit & Co., Plaquemine, reef shell and washgravel combination 1.17 mi. St. John the Baptist Parish, $14,063; 1.9 mi. Iberville Parish, $21,963. Grand total $1,221,168. Noted June 6, July 18 and 25.

Maryland—State Roads Comn., Baltimore, graveling 1.5 mi. Contr. Ch-65, Charles Co., to Jarboe & Haughton, Mechanicsville, $17,886. Noted June 27.

Md., Baltimore—Sheet asphalt on concrete paving 10,499 sq.yd. Contr. 529, to American Paving Co., Montebello Ave., $44,562.

Massachusetts—Dpt. P. Wks., rein.-con., granite block paving 3,388 ft. Andover, to J. P. McCabe, Inc., 20 Central St., Boston, $122,980—rein.-con. paving 6,000 ft. Milford, to C. Bianchi, Framingham, $80,817—11,234 ft. North Andover, to P. H. Holland, Lawrence, $99,509—bituminous macadam paving 800 ft. Canton, to Reynolds Bros., Inc., 179 Sumner St., Boston, $15,472. Grand total $318,778. Rejected bids bituminous macadam paving 5,650 ft. Sutton, will readvertise. Noted July 11.

Mass., Amesbury — Constructing sidewalks for year 1929, Point Shore Blvd., Wells and Goddard Aves., to R. G. Watkins, Amesbury. To exceed $25,000.

Mass., Boston—Sheet asphalt paving Commonwealth Ave., North Dr., to Warre Bros., 38 Charles River Rd., Cambridge, $32,000.

Mass., Boston—Dpt. P. Wks., sheet asphalt paving Everton St., Dorchester, to M. DeMatteo, 14 Rowe Pl., Roslindale, $20,378.

Mass., Boston—Dpt. P. Wks., bitulithic paving Brayton Rd., to J. C. Coleman & Sons Co., 1620 Tremont St., Roxbury, $22,881. Noted July 11.

Mass., Boston—Dpt. P. Wks., bitulithic paving, widening Buckingham St., Ward 4, to J. W. O'Connell, 24 Stuart Rd., Newton. Est. $25,000 or more. Noted June 27.

Mass., Medford (Dr. Boston)—Constructing streets to A. G. Tomasello & Son, Inc., 250 Stuart St., Boston. Est. $200,000.

Mass., Newton — Street Comrs., bituminous macadam paving Dedham and Greenwood Sts., to John Macdonald Constr. Co., 250 Stuart St., Boston; Clark and Walnut Sts., to J. P. McCabe Inc., 20 Central St., Boston. Total est. exceeds $25,000. Noted July 25.

Mass., Orleans—S. W. Winslow, South Orleans, trotting park with connecting buildings, South Orleans Rd., to R. Mayo, South Orleans. Est. exceeds $25,000.

Mass., Watertown — Bd. Selectmen repaving Mt. Auburn and Main Sts., to Simpson Bros. Corp., 77 Summer St., Boston. To exceed $25,000. Noted May 16 .

Constr. News page 58

Mich., Detroit—Grading, 3½ in. asphalt on 8 in. concrete paving nine avenues, to Detroit Asphalt Paving Co., 909 Transportation Bldg., $157,909.

Mich., Detroit—Grading, 3½ in. sheet asphalt on 8 in. concrete paving, Kay St., Sects. 1 and 2, Meyers Rd., West Chicago and Wexford Aves., to Detroit Asphalt Paving Co., 909 Transportation Bldg., $141,337—6 avenues and 1 drive to M. R. Hanna Co., Ryan Rd. and Nevada, $112,902.

Mich., Grand Rapids — Kent Co., curbing, guttering, widening 2¼ mi. Division St., 40 ft., to J. R. Edelman Co., Muskegon, $139,740.

Mich., Monroe—Concrete curbing, 8 in. concretep aving 12,980 sq.yd. Shadowlawn Pl., 7th and East 7th Sts., to Walter Knapp Co., Monroe, $47,000.

Mich., Pontiac—Grading, one course 8 in. concrete paving Thorpe, Raskob, Raeburn and Carter Aves., to Bartling & Dull, Dixie Hy., $59,236.

Minn., LeSueur—J. A. Morgan, city clk., grading, curbing, guttering 4,453 ft. concrete paving 9,292 sq.yd., to Hanlon & Okes, 1501 Merchants Natl. Bank Bldg., St. Paul, $29,431; storm sewers, to H. T. Gerischer, 1228 Dayton Ave., St. Paul, $5,498. Noted July 4.

Minn., Winona—G. W. Hofmann, city recdr., rein.-con. paving 10,862 sq.yd. Sarnia St., to Booth & Olson, 620 Insurance Exch., Sioux City, Ia., $30,967. Est. $35,000. Noted July 11.

Miss., Canton—Madison Co., clearing, grubbing, grading, bridging 1.499 mi. Flora-Bentonia Rd., Federal Aid Project 13, to M. Harvey Oakland, $39,592. Noted June 27.

Miss., Indianola—Curbing, guttering 2 in. warrenite on 4-45% clay and compound 6 in. gravel surfacing 16,000 sq.yd., to Dunn Constr. Co., Chamber of Commerce Bldg., Birmingham, Ala., and Merchants Bank Bldg., Jackson, $49,674.

Missouri—State Hy. Comn., Jefferson City, to Carte-Harlin Constr. Co., West Plains, grading 4.305 mi. Texas Co. $26,849—to Clark, Carney & Stark, Louisiana, 2.38 mi. Ralls Co. $32,210—to M. Haase, St. Joseph, 1.853 mi. Sullivan Co. $15,287; 3.716 mi. R. 4, Sect. 38, Mercer Co. $48,778; 4.65 mi. Sect. 39 same road, $25,910; 4.707 mi. Sect. 40 $63,649—to J. H. Miller & Son, Bethany, 4.516 mi. Gentry Co. $53,222—to Samples & Elsea, Kirksville, 4.558 mi. Adair Co. $40,579—to G. W. Condon, Omaha, Neb., 1.597 mi. Carroll Co. $28,809; 3.323 mi. Nodaway Co. $37,365—to A. P. Munsen, Marion, Ia., 3.239 mi. Carroll Co. $26,833—to J. M. Roark & Son, Anderson, 1.454 mi. Jasper Co. $24,315—to Kelly & Underwood, Granby, 4.953 mi. Oregon Co. $41,556—to Gaines Bros., Fairland, Okla., 3.481 mi. R. 4, Sect. 57, Schuyler Co. $59,398; 3.485 mi. Sect. 58 same road, $41,262—to McGlone & Walesby, Dearborn, 4.121 mi. R. 35, Sect. 3, Cass Co. $36,649; 4.557 mi. Sect. 4 same road, $26,505—to Garrett Constr. Co., Springfield, 1.701 mi. R. 60, Sect. 56, Shannon Co. $12,847; 3.482 mi. Sect. 57 same road, $39,380; 2.447 mi. Carter Co. $56,317; graveling 3.008 mi. Polk Co. $40,063—to M. E. Gillioz, Monett, 2.528 mi. Cole Co. $59,658; 1.786 mi. Montgomery Co. $59,934—to Kiefner & Geile, Perryville, 3.242 mi. Ste. Genevieve Co. $36,898—to C. Spitcaufsky, Kansas City, 4.863 mi. Camden Co. $57,034—to Imperial Trucking Co., 1900 Central St., Kansas City, 1.851 mi. Clinton Co. $2,896—to R. L. Williams, Charleston, 4.043 mi. R. 4-A, Mississippi Co. $25,425; 4.003 mi. R. 4-B, same county, $23,471—to Moore Bros. Constr. Co., East St. Louis, Ill., grading, concrete paving 2.246 mi. St. Louis Co., $69,776 — to Pope Constr. Co., Jefferson City, 1.455 mi. R. 54, Sect. 36, Audrain Co. $32,074; 3.571 mi. Sect. 37 same road, $80,728—to J. L. Wells Co., Inc., Rock Island, Ill., 4.776 mi. R. 13, Sect. 18, Lafayette Co., $59,515; 2.195 mi. Sect. 19 same road, $27,806; concrete paving 2.505 mi. Sect. 20-A, $29,090—to Edwardsville Constr. Co., Edwardsville, Ill., grading, concrete paving 3.198 mi. R. 33, Sect. 5-A, Clinton Co., $36,105; 2.241 mi. Sect. 6-A same road, $27,406—to P. Simons, Quincy, Ill., 1.919 mi. R. 65, Sect. 10-A, Grundy Co. $22,070; 4.026 mi. Sect. 11-A $26,512; 2.185 mi. Sect. 12-A $13,551; 3.066 mi. Sect. 13 $45,993—to Zeigler Bros., Greensboro, N. C., 4.005 mi. R. 71, Sect. 80, Vernon Co. $73,365; 2.846 mi. Sect. 81 $49,599—to Ebbe Constr. Co., Trenton, 0.6 mi. Mercer Co. $27,278—to M. T. Davidson Jr., St. Louis, 4.067 mi. St. Louis Co. $124,800—to M. N. Penny, Lawrence, Kan., 2.882 mi. R. 59, Sect. 1-A, Platte Co $53,605; 2.956 mi. Sect. 1 same road $57,303—to W. C. Johnson, Belleville, 2.075 mi. St. Louis Co. $80,998—to O. O. Fuller, Nevada, chats surfacing 3.766 mi. R. 12, Sect. 7, Barton Co., $32,304; 2.37 mi. Sect. 8 same road $29,439; 4.477 mi. Vernon Co. $41,841—to DuBois & Co., Pittsburgh, Kan., 4.025 mi. Bates Co. $10,145. Grand total $2,087,886. Noted June 20.

Mo., Clayton—St. Louis County Court, Court House, grading, rein.-con. paving 19,980 sq.yd. North and South Rd., to J. M. McMahon, Buder Bldg., St. Louis, $51,285. Noted June 6.

Mo., St. Louis—Bd. P. Serv., City Hall, grading, concrete paving 1,120 sq.yd. alley, to Chase Constr. Co. 5230 Devonshire Ave., $3,320; 14,510 sq.yd. to Joseph McMahon Contg. Co., Buder Bldg., $35,628. Noted June 17.

Neb., Nebraska City—Asphalt paving 21,000 sq.yd., to Abel Constr., Co., 308-11 Terminal Bldg., Lincoln at $1.59.

Nevada—State Hy. Comn., Carson City, grading, crushed stone surfacing 12.8 mi. Mineral Co., to Dodge Bros., Fallon, $59,337.

New Hampshire—State Hy. Dpt., Concord, 3 in. bituminous macadam on 8 in. gravel surfacing 1.35 mi. Cintoocook Valley, in Rindge, to Lane Constr. Co., 134 State St., Meriden, Conn., $32,065. Est. $43,000. Noted July 18.

N. J., Demarest—Bd. Council, Boro Hall, grading, bituminous macadam paving Orchard Pl., Meadow and Maple Sts., to Burns & Hall, Park Ave. Est. $25,000.

N. J., Garfield—Bd. City Council, City Hall, curbing, storm drains, paving DeWitt St., to G. M. Brewster & Son, 253 West Ft. Lee Rd., Bogota, $12,338—Jacob and Henrietta Sts., to Malcom Constr. Co., Inc., 57 Farnham Ave., $5,762. Noted July 11.

N. J., New Brunswick — Bd. Comrs., City Hall, resetting curbing, sheet asphalt on 6 in. concrete paving Redmond St., to Utility Constr. Co., 5 Spring St., $26,833.

N. J., New Brunswick—Middlesex Co., Court House, paving 3.5 mi Bordentown Turnpike from Old Bridge to South Amboy, to C. Sebolt, New Brunswick, $136,033.

N. J., Newton—Bd. Freeholders Sussex Co., Court House, constructing Swartswood Myrtle Grove Rd., Hampton Twp., to J. W. Heller Co., 878 Springfield Ave., Maplewood. Est. $25,000. Noted July 4.

N. J., Palisades Park—Bd. Council, Municipal Bldg., grading, concrete paving Hillside Ave., to Mahon Constr. Co., 297 Hudson St., Hackensack. Est. $25,000.

N. J., South Orange—Village Trustees, curbing, sewers, bituminous concrete on concrete paving Rynada and Forest Rds., to Standard Bitulithic Co., ft. of Brill St., Newark, $21,147 and $26,987 respectivevly.

N. J., Toms River—Bd. Freeholders, Ocean Co., Court House, improving 7 mi. Cedar Bridge-Manahawkin Rd., to Decker & Canning, Union, $461,420; 5.5 mi. Lakehurst-Whitings Rd., to Pizzinenti Bros., 14 Broad St., Ridgewood, $285,659. Noted July 18.

N. J., Union—Township Comn., Town Hall, recurbing, 7 in. single line concrete paving Monison, Strecher, Orange and Isabella Aves., to Decker Canning Co., Falls Bldg., $40,970.

New York—A. W. Brandt, comr. Highways, Albany, **(e.e. means engineers estimate)**, concrete paving 6.61 mi. road in Oswego Co., to Rochester Concrete Co., Inc., Rochester, $284,201 e.e. $395,672—2.42 mi. in Monroe Co., to William Bailey Corp., 25 Main St., Rochester, $106,072 e.e. $150,330—3.76 mi. Orange Co., to Waterbury Concrete Constr. Co., Tuxedo Park, $276,810 e.e. $408,237—2.64 mi. Westchester Co., to A. E. Ottaviano Inc., Croton-on-Hudson, $187,565 e.e. $309,520—roads in Ulster Co. and 5.01 mi. Columbia Co., to Lane Constr. Co., 134 State St., Meriden, comn., $309,063 and $246,609 respectively, e.e. $420,058 and $390,268 respectively—6.57 mi. Clinton Co., to Spellman Oliver Co., Chateaugay, $287,171 e.e. $401,756—0.42 mi. Saratoga Co., to Collins Bros., Mechanicsville, $25,032 e.e. $32,592—0.57 mi. Dutchess Co., to Haus-Child Constr. Co., Inc., New York, $24,486 e.e. $30,313—5.75 mi. Ulster Co., to Riteway Constr. Co., 299 Bway., New York, $415,748 e.e. $577,466—2.02 mi. Onondaga Co., to Provo Bros., Inc., Syracuse, $74,632 e.e. $105,370—graveling 1.96 mi. Albany Co., to Miller Bros. Constr. Co., Inc., 17 Main St., Hartford, Conn., $125,254 e.e. $201,373 — bituminous concrete paving 11.23 mi. Sullivan Co., to P. J. Meade Engineers & Contractors, Inc., 1254 6th Ave., New York, $449,139 e.e. $654,388—3 mi. in Essex Co., to D. B. Trowbridge, Inc., Ticonderoga, $88,842 e.e. $123,892. Grand total $3,015,583. Noted July 4 and 18.

N. Y., Brooklyn—J. J. Byrne, pres. Brooklyn Boro, to D. J. McCoy Asphalt Co., Avenue U and East 57th St., asphalt paving Bristol St., $22,707; Conklin Ave. $2,195; East 3rd St. $11,800; East 21st St. $8,900; East 53rd St., $11,606; East 93rd St. $5,572; Walsh Court $3,804; 11th Ave. $2,576—to B. Turecamo Contg. Co., New Cropsey Lane, East 2nd St. $11,199; Avenue P. $40,918; Quentin Rd. $8,487; West 10th St. $21,725—to Brooklyn Alcatraz Asphalt Co., 407 Hamilton Ave., East 21st St. $28,216; East 21st St. $21,134; 36th St. $5,093; 53rd St. $7,950; 64th St. $7,605—to M. J. O'Hara, 1228 Park Ave., New York, Coney Island Ave., $123,397—to R. Lynster, 454 East 49th St., East 89th St. $4,601—to Galco Contg. Co., 745 Dean St., East 95th St. $52,965—to C. Bennett Impvt. Co., 414 Rutland Rd., Gardener St. $8,820—to J. R. Meehan, Knapp St., $14,390—to Concrete Co., Orton and Nott Sts., Avenue X $4,736; sidewalks on New Lots Ave. $440—to Cowell Trucking Co., 400 Malbone St., regulating West 2nd St. $2,716. Grand total $433,552. Noted July 4.

N. Y., Long Island City—G. U. Harvey, pres. Queens Boro, Quegns Subway Bldg., to Slattery Contg. Co., regulating Avon St. $1,800; Quality St. $5,342—to M. J. Mastannano, 100 Walcott Ave., Far Rockaway, 48th St. $7,475—to Uvalde Asphalt Paving Co., Metropolitan Ave., Brooklyn, sheet asphalt on concrete paving 60th Lane $1,983; Seneca St. $2,708; 76th St. $7,120—to Boro Asphalt Co., 1301 Metropolitan Ave., Brooklyn, 111th St. $5,675; Forbell Ave. $4,418—to Meehan Paving & Constr. Co., Laurel Hill Blvd., 21st St. $7,437—to Cleveland Trinidad Paving Co., Flushing, Depot Rd., $10,533—to W. P. McDonald, Lawrence St., Flushing, 5th Ave. $28,503; 17th Ave. $36,835; Roosevelt Ave. $11,174; 95th St. $10,665; granite block paving South Rd. $298,180; bituminous macadam paving 150th St. $39,182—to Charles Bennett Impvt. Co., 465 Fenimore St., Brooklyn, curbing Metropolitan Ave. $15,335—to Sprague Constr. Co., Alameda St., Belle Harbor, granite block paving Farmers Blvd., $189,233. Grand total $683,598. Noted June 20.

N. Y., Rochester—Paving Plymouth Ave., to F. W. Crouch, Rochester, $172,770; concrete paving Buffalo Rd., to Rochester Vulcanite Co., Exchange Pl. Bldg., $167,806.

Streets and Roads (Continued)

N. C., High Point—Paving 50,000 sq.yd., to R. G. Lassiter & Co., Raleigh.

O., Akron—F. E. Swineford, dir. P. Service, grading, curbing, Texan paving 983 ft. Patterson Ave., to Thorpe Constr. Co., 610 Hippodrome Bldg., Cleveland, $12,596—1,860 ft. Greenwood Ave., to T. E. McShaffrey Co., 173 South Forge St., $14,927—vitr. brick paving 3,664 ft. Talbot Ave., to Hollinger & Davidson, 85 East Thornton St., $53,501—grading, sidewalks, guttering, cindering 12,700 ft. Reed Ave. et al., to Guran & Brancich, 1075 River St., $43,988. Grand total $125,012. Noted June 27.

O., Cleveland—Cuyahoga Co., granite curbing, grading, vitr. brick paving 48,000 sq.yd. Lander Rd. 4, to Bentley Bros., Hanna Bldg., $281,000. Est. $360,500. Noted June 13.

O., Cleveland—Cuyahoga Co., curbing, guttering, grading, vitr. brick on concrete paving 46,500 sq.yd. Brainard Rd. 3, to Rieley Bros., The Arcade, $264,168. Est. $328,511.

O., Columbus—Comrs. Franklin Co., F. L. Donnalley, clk., grading, bituminous macadam paving 0.663 mi. Glenburn Pl., 4 roads, to A. W. Burns Constr. Co., 424 Woodland Ave., $21,021. Noted July 4.

O., Columbus—W. H. Duffy, dir. Service, curbing, asphalt paving 14,715 sq.yd. Scioto St., Ogden and Harris Aves., to Cleveland Trinidad Paving Co., 55 East State St., $69,540—curbing, guttering, brick paving 1,170 ft. Aberdeen Ave., and asphalt paving 1,510 sq.yd. Pearl and Newton Sts., to C. & G. Constr. Co., 1381 Essex St., $12,989 and $6,782 respectively—3,025 sq.yd. 8th Ave., to B. F. Patterson, 999 West Goodale St., $12,277—1,450 sq.yd. Korbel Ave., to R. J. Dienst, 209 South High St., $7,443. Grand total $109,031.

O., Dayton—Montgomery Co., rein.-con. paving Litchfield Ave., to W. S. Little, 1209 Everett Dr., $29,000. Est. $35,000.

O., Kent—Curbing, brick on 6 in. concrete with sand cushions, asphalt filler paving North Willow St., to H. Wright, Kent, $26,498. Est. $30,000.

O., Parma (br. Cleveland)—Sheet asphalt paving Berth Ave. and concrete paving Brookdale Ave., to F. W. Stollfus, Western Reserve Bldg., Cleveland, $16,671 and $31,549 respectively; Freehold Ave., to E. F. Miller Contr. Co., 4614 Prospect Ave., Cleveland, $5,976. Grand total $54,196.

O., Toledo—Curbing, widening, asphalt block paving 51,828 sq.yd. Summit St., to Harris & Tansey, Security Bank Bldg., $249,826. Est. $353,232.

O., Toledo—Curbing 4 in. brick paving 17,330 sq.yd. Central Ave., to McKecknie-Pierce Co., Nicholas Bldg., $88,623. Est. $104,078.

Olkahoma—State Hy. Dept., Oklahoma City, concrete slab surfacing 6 mi. roads in Alfalfa Co., to Standard Paving Co., 2115 East 11th St., Tulsa, $101,742, est. $110,000—5.63 mi Grant Co., to Hyde Constr. Co., Amer. Bank Bldg., Enid, $91,387—5 mi. Kay Co., to Brooks & Dohleren, 2115 West 18th St., Oklahoma City, $75,196—6.383 mi. Kingfisher Co., to Park & Co., Okmulgee, $94,672—8.68 mi. Pottawatomie Co., to G. P. Carr Constr. Co., Shawnee, $124,469. Grand total $487,466. Noted July 11.

Okla., El Dorado—Grading, concrete paving 12,165 sq.yd. Market and East Main and 5th Sts., to Ashland Constr. Co., Masonic Bldg., Enid, $44,932. Est. $45,600.

Pennsylvania—State Hy. Comn., Harrisburg, grading 33,131 cu.yd. Bucks Co., to H. S. Shafer, Nazareth, $35,746—17,900 cu.yd. Mifflin Co., to A. G. Andrews Eng. Co., Tyrone, $48,977—30,970 cu.yd. Clarion and Forest Counties, to H. S. Hull, Smithport, $42,927—bituminous surface treating 5,914 sq.yd. Clinton Co., to C. B. Elder, Renoro, $34,257—concrete paving 33,613 sq.yd. Blair Co., to Clark Bros. Constr. Co., Cherry Tree, $288,061—33,300 sq. yd. Erie Co., to Lewis & Copeland Constr. Co., Lima, O., $137,650—79,800 sq.yd. Lancaster and Chester Counties, to W. Grant Raub Co., Red Lion, $328,820—12,000 sq.yd. Lawrence Co., to J. C. Devine, Meadville, $169,921—37,867 sq.yd. Lehigh Co., to Continental Contg. Co., Knickerbocker Bldg., Baltimore, Md., $178,084—11,425 sq.yd. Snyder Co., to J. M. Hutchison & Narehood Bros., Altoona, $53,195—2,808 sq. yd. Bradford Co., to R. D. Richardson Constr. Co., Scranton, $19,901—2,800 sq.yd. Clearfield Co., to D. Bailey, Morrisdale, $42,431—30,950 sq.yd. Warren Co., to Kirkpatrick & Wallace, Johnsburg, $117,516. Grand total $1,497,495. Noted June 6 and July 4.

Pennsylvania—State Hy. Comn., Harrisburg, concrete paving 38,000 sq.yd. Allegheny Co., to E. H. Canon, Jenkins Arcade, Pittsburgh, $275,973—10,122 sq.yd. Luzerne Co., to B. G. Coon Constr. Co., Luzerne $34,375—3,950 sq.yd. Tioga Co., to Colonial Constr. Co., Arrott Bldg., Pittsburgh $21,756—46,300 sq.yd. Allegheny Co., to D. W. Challis Sons, Inc., Sewickley $255,364. Grand total $587,468. Noted July 4.

Pa., Phila—Dpt. P. Wks., Bureau Hys., A. Murdock, dir., City Hall Annex, improving City Ave. and Neill Dr., to Yetman & Garafola, Real Estate Trust Bldg., $118,526—asphalt repaving (assessment work) Orthodox St., to Eastern Asphalt Co., Penn Bldg., $21,649—asphalt repaving Tasker St., to Barber Asphalt Co., Hunting Park at E. St., $11,841—structural steel for Spring Garden Street Bridge 12 over Schuylkill River, to G. F. Dobbin, 1020 South 47th St., $4,220. Grand total $156,436. Noted July 11

Pa., Pittsburgh—To M. O'Herron Co., South 1st St., regrading, repaving North Ave., $46,429; grading, curbing, paving Woodlawn Ave. $23,715; Jeffers St. $31,572—to Scanlon Bros., Rakewell Bldg., Tonopah Ave., $37,333—to Minsinger Co., 1201 Vickroy St., Crane Ave. $19,336—to McDonough & O'Toole Co., Plaza Bldg., Straka St. $29,046—to Nardulli & Sons Co., 608 Larimer Ave., Faronia St. $23,345—to DePasquale & Co., 373 Bouquet St., Brushton Ave. $45,666. Grand total $256,443.

Tex., Jacksonville—City, c/o Secretary, 1½ in. and 2 in. rock asphalt on 5 in. concrete paving 45,000 sq.yd., to F. P. McElwrath, P.O. Box 727, Corsicana, $131,000. Est. $140,000. Noted July 11.

Tex., Sugarland—Curbing, guttering, concrete paving 10,000 sq.yd., to Brown & Root, Post Dispatch Bldg., Houston, $45,000.

Virginia—Dpt. Hys., Richmond, grading, 0.704 mi. Bedford Co., to Maryе & Blankenship, Shawsville, $19,194—macadam paving 3.596 mi. Washington Co., and 2.225 mi. Scott Co., to R. H. Bolling, Norton, $39,238 and $66,405 respectively—rock asphalt paving 0.742 mi. Clarke Co., to Battershill, Sadler & Terry, Virgilina, $25,422 or $22,561—concrete paving 3.882 mi. Chesterfield Co., to Spotsylvania Constr. Co., Highland Springs, $106,299—bridge over Jackson River, Alleghany Co., to Atlantic Bridge Co., Inc., Greensboro, N. C., $33,462. Noted July 18.

Wash., Olympia—City Comrs. paving streets surrounding St. Peters Hospital to F. E. Wilder, Olympia, $24,166.

Wash., Seattle—Comrs. King Co., reconstructing 5.75 mi. Tolt-Falls City Hy., to Moran Constr. Co., Alaska Bldg., $68,384. Est. $74,000.

Wash., Seattle—Bd. P. Wks., paving West Dravius St., to R. G. Stevenson, 1327 Northlake Ave., $81,874—12th Ave. S., to J. B. Covello, 1510 Sturges Ave. S., $24,251—concrete sidewalks on Brandon St., to McLellan & McLellan, Green Bldg. $24,978. Grand total $131,103.

W. Va., Beckley — Raleigh Co. Court, constructing Lester-Surveyor Rd., to J. H. Hawel, Beckley, $24,188; Glen Danile-Bolt Rd., to Echols Constr. Co., Cass, $75,500.

W. Va., Moundsville—Court Marshall Co., rein.-con. paving Jefferson Ave. extension, to Stringer & Springer, Wheeling Bank & Trust Bldg., Wheeling, $25,249.

Wisconsin—State and Green, Grant, Lafayette Counties Hy. Comns., Madison, crushed graveling 12,000 cu.yd. Job 1, to A. W. Gallagher & Son, Madison, $13,298—3,000 cu.yd. Job 2, to P. W. Ryan & Sons, Janesville, $3,400—9,600 cu.yd. Jobs 9183—A, 2, 3, 4, and 5, to Becker & McLimans, Stitzer, $8,088—concret epaving 8,640 sq.yd. Main St., Cochrane, Buffalo Co., to Booth & Olson, Sioux City, Ia., $20,656—bituminous wearing surfacing 6,000 sq.yd. Dodge Co., to J. P. Humphries, Milwaukee, $4,740—Van Housen Bridge, Pepin Co., to H. F. Hurtley, Mondovi, $4,779. Grand total $50,182.

Wis., Milwaukee—Dpt. P. Wks., to N. Harris, 6309 Girard St., paving 1 alley, $1,464—to Gumz & Switalski, 831-13th Ave., 1 alley $5,721—to Schwerm Bros., 1703 Weil St., 2 alleys $2,671; Townsend St. $3,833—to Arcole Constr. Co., 105 Wells St., 1 alley $1,172; Burrell St. $17,038; Euclid Ave. $11,885—to Blech Constr. Co., 464-21st St., 3 alleys $6,803—to W. F. Hunt, 445 Milwaukee St., 1 alley $3,132—to A. J. Koch, 1297 Cramer St., Brust Ave. $1,008; 56th St. $2,647—to Czerwinski Constr. Co., 816 Clinton St., Austin St $7,259; 41st Ave. $19,682; 47th St. $12,422; 68th St. $22,—Constr. Co., 464 21st St., 3 alleys $6,803—to waukee General Constr. Co., 857 8th Ave., 54th St. $2,961—to Badger Constr. Co., 97 East Wisconsin Ave., Burrell St. $6,528; Griffen St. $23,428; Parker St. $24,664; Quincy Ave. $11,459 Grand total $197,340.

Wyoming—State Hy. Comn., Cheyenne, mastic wearing surfacing 130,000 sq.yd. Federal Aid Project 183-A, to T. J. Tobin Co., Denver, Colo., $79,684; bridging, grading 69,550 cu.yd. S.P. 784, to S. L. Smith, Dearing, Neb., $23,236.

Ont., Alliston—Concrete paving King and Victoria Sts., to H. J. Clark, 28 Lessard Ave., Toronto. Est. $55,000.

Ont., Guelph—Concrete paving 20,000 sq.yd. Cavell Ave., Central Extra, King, Quebec, Oxford, Palmer, Southampton and Yorkshire Sts., day labor. $60,000. H. S. Nicklin, City Hall, engr.

Ont., Hamilton — Concrete paving Herkimer St., Haddon and Dromore Crescents, by day labor, under supervision of W. H. McFaul, city engr. $55,000.

Ont., Islington—Etobicoke Twp., concrete sidewalks on Islington and Longbranch Sts., to P. Angotte, 809 St. Clarens Ave., $16,372, and Hillcrest Constr. Co., 36 Toronto St., $13,580 both Toronto. Est. $29,952.

Ont., Oakville—Holton Co., concrete paving 9 mi. roads to King Constr. Co., Oakville. Est. $175,000.

Ont., Toronto—York Twp. asphaltic concrete, asphalt on concrete paving 2.25 mi. Winfield Ave., Ava, Chiltern Hill, and Glencedar Rds., to Constructing & Paving Co., Confederation Life Bldg., $85,016. Est. $85,000.

Que., Lapraine—Dpt. Roads, Quebec, concrete surfacing 3 mi. approach road to South Shore Bridge, to Kennedy Constr. Co., Ltd., 137 McGl. St., Montreal, $500,000.

EXCAVATION, DRAINAGE, IRRIGATION, LEVEES, RIVER AND HARBOR

Proposed Work

Ark., Texarkana—City, c/o S. C. Nancarrow, mayor, preliminary plans drainage system along Nix's Creek in eastern and southern sections of city, and in Texarkana, Tex. $135,000. J. W. Dawson, City Hall, engr.

Calif., Sacramento—Sacramento-San Juaquin Reclamation Dist. improving Sacramento-San Juaquin Flood Control District, $325,000 available. State will furnish $175,000, Federal Government $100,000, and property owners $50,000. Private plans. Noted Feb. 21.

Ill., Quincy—State of Illinois, Springfield, repairing drainage districts, levees between South Quincy and Indian Grove Drainage Dists., Adams Co. $30,000 appropriated. L. D. Cornish, Div. Waterways, Springfield, engr.

Okla., Spiro—Le Flore Co. preliminary plans levee district along south bank Arkansas River, $50,000. Engineer not selected.

Wash., Seattle—City Council, reconstructing seawall along Alki Ave. between Luna Park and Alki Bathing Beach, sheet piling replacing wooden bulkhead. $85,000. W. D. Barkhuff, city engr.

Bids Asked

Calif., La Mesa—Aug. 12, by Directors La Mesa, Lemon Grove & Spring Valley Irrigation Dist., 1,243 ft. concrete and electrically welded steel pipe for Alvarado Syphon Replacement.

Calif., San Francisco — State, Sacramento, bids about Aug. 1, 250 ft. concrete retaining wall, 16 ft. high, stairways San Francisco Teachers College, $40,000. G. B. McDougall, Sacramento, state archt.

Contracts Awarded

O., Medina—Cleveland Metropolitan Park Bd., W. A. Stinchcomo, dir., West 3rd St. and Frankfort Ave., 17,600 tons stone jetties in Huntington Park, to American Constr. Co., 1276 West 3rd St., Cleveland, $74,696.

N. S., Brooklyn—S. E. O'Brien secy. Dpt. P. Wks., Ottawa, Ont., dredging, to Beacon Dredging Co. Ltd., Halifax, $111,250. Noted May 16.

N. S., Whitehead—S. E. O'Brien, secy. Dpt. P. Wks., Ottawa, Ont., dredging, to J. S. Gregory Hilyard St., Halifax, $18,900. Noted June 6.

N. S., Yarmouth—S. E. O'Brien, secy. Dpt. P. Wks., Ottawa, Ont., dredging, to Beacon Dredging Co. Ltd., Halifax, $20,000. Noted May 30.

Public Bond Elections

Coming Bond Elections

Waterworks—Norborne, Mo., Aug. 6, $75,000.
Waterworks—Humble, Tex., Aug. 3, $100,000.
Waterworks and Sewers—Pasadena, Tex., Aug. 19, $83,000.
Bridges—Jefferson County, Tex., $1,000,000.
Court House—Jefferson County, Tex., Aug. 10, $1,000,000.

Bonds Voted

Waterworks—Clinton, Okla., $600,000, Benham Engr. Co., Okla. City, Engrs.
Waterworks—Waurika, Okla., $52,500.
Waterworks and Sewers—Midlothian, Tex., $65,000.
Bridges—Moorhead, Minn., $65,000.
Airport—Seminole, Okla., $30,000. Long & Co., Okla. City, Engrs.
Schools—San Antonio, Tex., $3,700,000.

FEDERAL GOVERNMENT

Proposed Work

Calif., Richmond—TRAINING WALL—U. S. Engineer Office, San Francisco, extending training wall, in Richmond Harbor.

Tenn., Memphis—LEVEE—U. S. Engineer Office rejected bids May 22, 2,153,000 cu.yd. levee work in Bird's Point New Madrid Floodway Sect. 4c. Work will be readvertised. Noted Apr. 25.

Bids Asked

D. C., Wash.—MOTOR TRUCKS, etc.—Aug. 7, by A. L. Flint, purch. agt. Panama Canal, motor trucks, concrete mixed, steel conduit, pipe fittings, cable wire, panel boards, etc. Schedule 1978.

D. C., Wash.—SUPERSTRUCTURE—Aug. 28, at office Executive Officer, Arlington Memorial Bridge Comn., Navy Bldg., superstructure Bridge Plaza and water gate features at Washington end, Arlington Memorial Bridge; adv. E. N.-R. Aug. 1.

D. C., Wash.—SHOP EXTENSION—Aug. 14, by Bureau Yards & Docks, Navy Dpt., 100 x 120 ft. brick shop extension, concrete foundation.

Ill., Hines—OIL BURNING EQUIPMENT—Aug. 20, by U. S. Veterans Bureau, Arlington Bldg., Wash., D. C., furnishing and installing fuel oil burning equipment, at U. S. Veterans Hospital.

La., New Orleans—EARTHWORK—Aug. 15, by U. S. Engineer Office, foot Prytania St., 819,000 cu.yd. earthwork in Atchafalaya River

Constr. News page 59

Federal Government (Continued)

Levees, New Orleans River Dist. Noted July 11.

Mass., Fitchburg—EXTENSION—Aug. 26, by Treas. Dpt., at office Supervising Archt., Wash, D. C., 2 story, basement, 58 x 115 ft., brick, stone extension, J. A. Wetmore, Wash., D. C., act. superv. archt.; adv. E. N.-R. Aug. 1.

Mass., Hingham—MAGAZINES—Aug. 7, by Bureau Yards & Docks, Navy Dpt., Wash., D. C., 5 magazines and road. Noted July 18.;

Md., Baltimore—DREDGING—Aug. 22, by U. S. Engineer Office, Custom House, 2,367,000 cu.yd. dredging from Baltimore Harbor and channels; adv. E. N.-R. Aug. 1. Noted July 4.

N. Y., Flushing—DREDGING—Aug. 30, by U. S. Engineer Office, Army Bldg., 39 Whitehall St., New York, dredging 30,700 cu.yd. in Flushing Bay; adv. E. N.-R. Aug. 1.

N. Y., Iona Island—STEEL MAST—Aug. 14, by Bureau Yards & Docks, Navy Dpt., Wash., D. C., steel mast, at Naval Ammunition Depot. Noted Aug. 1; adv. E. N.-R. Aug. 1.

N. C., Fort Bragg—MAGAZINES—Aug. 28, at office Constructing Quartermaster, 4 ammunition magazines and connecting road. Adv. E. N.-R. Aug. 1.

O., Dayton—BOILER HOUSE—Aug. 24, at office Constructing Quartermaster, Wright Field, boiler house, stack and tunnel, incl. mechanical equipment and utilities at Wright Field; adv. E. N.-R. Aug. 1.

S. C., Parris Island—REFRIGERATING SYSTEM—Aug. 14, by Bureau Yards & Docks, Navy Dpt., Wash., D. C., refrigerating system, at Marine Barracks. Noted Aug. 1.

Va., Fort Humphreys—QUARTERS—Aug. 23, at office Constructing Quartermaster, 27 sets of non-commissioned officers' quarters; adv. E. N.-R. Aug. 1. Noted May 2.

Bids Received

Colorado—ROAD—Bureau P. Rds., Denver, July 12, grading 3.95 mi. Tennessee Pass, Sect. F Project, Lake Co., from W. W. Giggey & Co., Boulder, $52,017.

La., New Orleans—BRIDGES and NEEDLES—U. S. Engineer Office, service bridges and needles Bonnet Carre Spillway from Doullut & Ewin, Inc., Q. and C. Bldg., $193,933. Noted July 18.

Missouri—DIKES—U. S. Engineer Office, Postal Telegraph Bldg., Kansas City, July 11, 4,200 ft. standard pile clump dikes in Missouri River, Contrary Bend, and 9,100 ft. at Kenmore Bend, from Bilhorn Bowers & Peters, Railway Exc. Bldg., St. Louis, $122,690 and $266,250 respectively. Noted June 28.

Wyoming—ROAD—Bureau P. Rds., Denver, July 12, grading 0.123 mi. Buffalo Tensleep Rd., Sects. A2 and C3, Washakie Co., from C. M. Smith, Thermopolis, $14,529.

Contracts Awarded

Colorado—ROADS—Bureau P. Rds., Custom House, Denver, grading 3.45 mi. Willow Creek Pass, Sect. B, Grand Co., to Pioneer Constr. & Eng. Corp., 501 Denham Bldg., Denver, $70,809; 1.998 mi. Dolores Rico Rd., Sect. C Project, Montezuma Co., to W. A. Colt & Son, Las Animas, $55,534. Noted July 18.

Illinois—LEVEE—U. S. Engineer Office, St. Louis, Mo., 135,000 cu.yd. earthwork in South Beardstown Drainage and Levee Dist., to M. H. Anglin, Collinsville, at $0.1972 per cu.yd.; 7,000 lin.ft. bank revetment at Scudder Towhead, to W. P. McGeorge, Pine Bluff, Ark., $197,750; both in Mississippi River. Noted July 18.

Kan., Elwood—CULP DIKES—U. S. Engineer Office, Postal Telegraph Bldg., Kansas City, 7,500 lin.ft. dikes in Missouri River to Woods Bros. Constr. Co., Lincoln, Neb., $180,750. Noted July 25.

La., New Orleans—LEVEE—U. S. Engineer Office, to Grasser Constr. Co., Maritime Bldg., 370,000 cu.yd. (Convent) $51,171—to R. T. Clark Co., Inc., Delta Constr. Co., John W. Noble Co., T. W. Crow, Fayette, Miss., 190,000 cu.yd. Forest Home, $39,900—to Lewis Chambers Constr. Co., New Orleans, 294,000 cu.yd., $48,451; 1,300,000 cu.yd., Upper Morganza, $324,220; 1,050,000 cu.yd., Upper New Texas, $278,985—to S. Leopold, New Orleans, 310,000 cu.yd. in Golmine Lucy, $49,600—to Highway Constr. Co., Godchaux Bldg., 750,000 cu.yd. Bayou Goula, $134,850—to C. J. Jones, St. Louis, Mo., 2,000,000 cu.yd. in Baton Rouge-Gray, $340,460; 2,130,000 in Indian Camp Southwood, $377,649; 1,050,000 cu.yd. in Baton Rouge 2, $196,665—to Orleans Dredging Co., Maison Blanche, 1,260,000 cu.yd. in Hermitage Kelson, $302,400—to Valley Constr. Co., Memphis, Tenn., 2,238,000 cu.yd. White Oaklake, $514,740—to Levee Constr. Co., Inc., New Orleans, 4,400,000 cu.yd. Bedford Bayou, $878,680—to Lower Coast Constr. Co., Godchaux Bldg., 1,900,000 cu.yd. in Donaldsonville-St. James, $284,810—to D. B. Hearin & Son, Baton Rouge, 815,000 cu.yd. St. Elmo Angelina Lots 1 and 2, $108,965. Grand total $3,931,546. Noted June 20 and July 4.

Pa., Fort Mifflin (mail Phila.)—MASTS, etc.—Spec. 5633—Bureau Yards & Docks, Navy Dpt., Wash., D. C., steel masts for lighting protection, at Naval Ammunition Depot, to McCay & Kirkland, 652 Equitable Bldg., Baltimore, Md., $24,535 (120 days). Noted July 4.

Tenn., Memphis—LEVEE—U. S. Engineer Office, 2,056,000 cu.yd. levee work in Bird's Point New Madrid Floodway, to Clark Bros. Constr. Co., Clinton, Ia., $323,820—1,990,000 cu.yd. to J. J. McCaughey Co., 189 West Madison St., Chicago, Ill., $398,000—and 2,169,000 cu.yd. to J. D. Yeats, Fort Tampa City, Fla., $618,165. Grand total $1,339,985. Noted April 25.

Tex., Fort Sam Houston (sta. San Antonio)—WATER SOFTENER—Quartermaster Dpt., water softener, to Permutit Co., 440 4th Ave., New York, $7,800. Noted June 13.

Utah—ROAD—Bureau Reclamation, Dpt. Ketchum-Clayton Rd., Sawtelle Nafl. Forest, to Drummie Constr. Co., Downey, $52,651. Noted July 4.

Va., Norfolk—BATTLE TARGETS—U. S. Engineer Office, removing and disposing of 2 navy battle targets in James River, off Mulberry Point, to Norfolk Lighterage Co., Inc., foot Commerce St., $8,008. Noted June 13.

Constr. News page 60

RAILWAYS

Proposed Work

Iowa—Chicago, Milwaukee, St. Paul & Pacific R.R. Co., C. F. Loweth, ch. engr., Union Station, Chicago, Ill., relocating main line at Sioux City to eliminate 12 grade crossings.

Ohio—Northern Ohio Power & Light Co., North Main St., Akron, 1,200 ft. double track and 300 ft. single track in Wooster Ave. N., Barberton. $38,000-$40,000.

Ohio—Suburban Light & Power Co., Alliance, soon takes bids 1 mi. new rails within city limits of Alliance. $25,000.

Contracts Awarded

Iowa—Chicago, Milwaukee, St. Paul & Pacific R.R. Co., C. F. Loweth, ch. engr., Union Station, Chicago, Ill., 3 mi. railroad, reconstructing bridges, eliminating grade crossings 2nd and Douglas Sts., to Dorman St., Sioux City, to John Marsch, Inc., 1307 Wrightward Ave., Chicago, Ill. Est. $1,000,000.

O., East Cleveland (br. Cleveland)—Cleveland Union Terminal Co., Terminal Tower, Cleveland, railroad trestle along New York, Chicago & St. Louis tracks near Lakewood Rd., and 249 ft. rein.-con. retaining wall, to Walsh Constr. Co., 13128 Cobden Court, Cleveland.

GRADE CROSSINGS

Proposed Work

Calif., Long Beach—City rein-con. underpass, under Pacific Electric Ry., Los Carritos St. $142,000 A. H. Adams, City Hall, engr.

Ky., Louisville—See "Bridges."

N. C., Burlington—City, underpass carrying main street under Southern Ry. A. C. Lineburg, city engr.

Okla., Oklahoma City—Oklahoma Co., rein.-con., underpass under Rock Island R.R. tracks at Reno St. and Grand Blvd. $45,000. R. S. James, Court House, engr.

Okla., Westville—State Hy. Dept., Oklahoma City, preliminary plans 90 ft. span steel truss overpass over Kansas City, Southern Ry., on Hy. 17, Adair Co. J. Rightmire, Oklahoma City, engr.

Ont., Cornwall — Ontario Provincial Govt., Toronto, subway, 40 ft. wide, and 25 ft. roadway, 6 ft. walk under Ottawa & New York R.R. $150,000. Address Ontario Dpt. P. Hys., Toronto.

Ont., Windsor—City Council and Canadian Pacific Ry., B Ripley, ch. engr. (Ontario Dist.), Toronto subway under railroad tracks at Ellis Ave. $500,000.

Contracts Awarded

Mich., Ecorse—Detroit, Toledo & Ironton R.R. Co., Coolidge Hy., Dearborn, grade separation incl. 2 rein.-con. and steel spans, to C. R. Boulton, 10 East Town St., Columbus, O. Est. $100,000.

N. Y., Phelps—Pennsylvania R.R. Co., T. J. Skillman, ch. engr., Broad Street Station, Phila., Pa., eliminating Rockefeller and Peak Crossings, near here, Ontario Co., to Arthur McMullen Co., 50 Church St., New York, $57,024. Est. $97,298. Noted June 6 under "Unclassified."

W. Va., St. Albans—City Council, undergrade crossing at 3rd St., for City and Chesapeake & Ohio R.R. Co., Richmond, Va., to West Virginia Constr. Co., Charleston. $110,000.

TUNNELS AND SUBWAYS

Bids Asked

N. Y., New York—Aug. 2, by Bd. Transportation, J. H. Delaney, chn., 49 Lafayette St., constructing railroad duct line, Route 104, part 53rd St. and East River Rapid Transit R.R.

Bids Received

Pa., Phila.—Dpt. City Transit, C. E. Meyers, dir., City Hall Annex, July 19, 4,565 ft. 2-track subway and appurtenant work in Ridge Ave. between 8th and Broad Sts., Contr. 301, from Keystone State Corp., Philadelphia Bank Bldg., $4,037,390. Noted June 27 under "Unclassified."

DAMS

Proposed Work

N. J., Westfield—Town Council, and Union Co. (Elizabeth), dam, storm sewer outlet and Mindowaskin Park Lake. $85,000.

Que., Montreal—Shawinigan Water & Power Co. Ltd., Power Bldg., dams on St. Maurice River, $300,000.

Bids Asked

N. Y., Salamanca—Aug. 19, by D. H. Ames, executive secy., Allegany State Park Comn., Red House, concrete dam and concrete bridges Allegany State Park, near here; adv. E. N.-R. Aug. 1.

PIERS AND WHARFS

Proposed Work

PIER — **Miami Beach, Fla.** — Miami Beach Pier Corp., G. R. K. Carter, pres., 13 Ocean Dr., soon takes bids 600 ft. pier. W. F. Brown, Bastain Bldg., archt.

Bids Asked

PIER — **Long Beach, Calif.** — Neptune Pier Co., Silver Spray Pier, taking bids extending 664 ft. pier, 378 ft. wide, incl. ice skating rink, other concessions. $2,000,000.

WHARF—**Middle Saraquet, N. B.**—Aug. 8, by S. E. O'Brien, secy Dpt. P. Wks., Ottawa, Ont., wharf.

ICE PIER—**Barrington Passage, N. S.**—Aug. 3, by S. E. O'Brien, secy. Dpt. P. Wks., Ottawa, Ont., constructing Ice Pier 4. $35,000.

WHARF REPAIRS — **Kamouraska, Ont.** — Aug. 9, by S. E. O'Brien, secy. Dpt. P. Wks., Ottawa, Ont., repairing wharf.

WHARF EXTENSION—**Bedeque, P. E. I.**—Aug. 12, by S. E. O'Brien, secy. Dpt. P. Wks., Ottawa, Ont., extending wharf and constructing freight shed.

Bids Received

PIER SHED, etc.—**New York, N. Y.**—M. Cosgrove, comr. Docks, Pier "A" foot Battery Pl., North River, July 25, pier and bulkhead on Pier (new) 3, Morris St., North River, from Lane Ogle, Betts Ave., Brooklyn, $757,000. Noted July 18.

Contracts Awarded

DOCK—**Milwaukee, Wis.**—Dpt. P. Wks., R. E. Stoelting, comr., concrete dock, railings at Milwaukee River Flushing Tunnel Intake, to E. E. Gillen, 288 East Water St., $55,018. Noted June 27.

WHARF—**Woodwards Cove, N. B.**—Dominion Govt., Ottawa, Ont., wharf, to T. P. Charlson, 179 Gilmour St., Ottawa, Ont., $29,870.

WHARF—**Sorel, Que.**—Dominion Govt., Ottawa, Ont., wharf, to Cummins & Robinson, 70 Lombard St., Toronto, Ont., $258,500.

AIRPORTS

Proposed Work

Calif., Alameda — San Francisco Airdrome, Inc., c/o L. Schloss, archt., 5625 Ocean View Dr., Piedmont, soon takes bids, airdrome, administration building, 3 steel hangars, near Estuary Tube. $1,000,000 or more; grading contract to W. K. McMillan, 2088 Howard St., San Francisco.

N. Y., Long Island City — New York Air Terminal, 825 8th Ave., New York, 1 story, 120 x 140 ft. hangar, Riker Ave. and 90th St. $50,000. Private plans.

Okla., Oklahoma City—Universal Air Lines Co., sketches hangar, city airport. $75,000. Private plans.

Tex., San Antonio — See "Factories and Mills."

Contracts Awarded

Mich., Detroit—Dpt. P. Wks., 1 story, 200 x 1,010 ft., brick, rein.-con. hangar, Gratiot Ave., to W. E. Wood Co., Union Trust Bldg., $609,500. Noted July 11.

Mo., Bridgeton—City of St. Louis, c/o Bd. P. Serv., 308 City Hall, St. Louis, rein.-con. apron, rein.-con. or vibrated concrete paving 27,845 sq.yd Lambert-St. Louis Flying Field, here, to Kesl-Lonergan Co., 4829 Easton Ave., St. Louis, $72,108. Est. $81,400. Noted July 25.

GRAIN ELEVATORS

Proposed Work

GRAIN ELEVATOR — **Galveston, Tex** — Galveston Wharf Co., 2324 Avenue B, bids after Aug. 10, grain elevator, incl. 84 x 232 ft., rein.-con., steel shed, 427 bins, 4 receiving elevator legs, 16 double auto power grain shovels, 8 double action Paterson car door removers, auto fire pumps, fire alarms, power motors, scales. $2,000,000. Private plans. Noted Apr. 11.

Grain Elevators (Continued)

Bids Asked

GRAIN CONVEYOR GALLERIES—St. John, N. B.—Aug. 5, by Harbour Comrs, grain conveyor galleries.

GRAIN ELEVATOR—Kingston, Ont.—Canada Steamship Lines, ft. of Bay St., Toronto, taking bids substructure 1,300 ft. grain elevator, 200 ft. high, timber or concrete piling, concrete found. $2,000,000. C. D. Howe & Co., Whalen Bldg., Port Arthur, engrs. Noted July 18.

Contracts Awarded

GRAIN ELEVATOR—Minneapolis, Minn.—Continental Grain Co., A. B. March, secy., 563 Chamber of Commerce Bldg., rein.-con. grain elevator, 25th Ave. and Chicago Great Western R.R. tracks, to Bland Eng. Co., L and Kennedy Aves. Est. $100,000.

WHARF—Hamilton, Ont.—Canadian Steamship Lines, foot Bay St., Toronto, substructure for concrete, steel wharf, foot Wentworth St., to Russell Constr. Co., Harbor Bldg., Toronto; superstructure, to Wilde & Brydon, C. P. R. Bldg., Toronto. Est. $250,000.

GRAIN ELEVATOR—Owen Sound, Ont.—Great Lakes Elevator Co., 1st Ave. W., general contract 2,000,000 bu. concrete, steel addition to grain elevator, to Barnett McQueen Constr. Co., Cuth Bldg., Fort William. Est. $400,000.

POWER AND LIGHTING

Proposed Work

Calif., Madera—Madera Irrigation Dist. power distributing system at Friant Dam, incl. transmission lines, stand-by steam plant.

Oklahoma — Oklahoma Gas & Electric Co., Insurance Bldg., Oklahoma City, granted franchise transmission line and distribution system in Glencoe. $25,000. Byllesby Eng. Co., 231 South La Salle St., Chicago, Ill., engrs.

Okla., Cloe Springs—Oklahoma Gas & Electric Co., Insurance Bldg., Oklahoma City, granted franchise transmission line, distribution system. $25,000. Byllesby Eng. Co., 231 South La Salle St., Chicago, Ill., engrs.

Utah, Salt Lake City—Bd. Comrs., E. MacDonald, city recdr., lighting system on Normandie Circle, Harvard, Princeton and Laird Aves.

GAS

Proposed Work

Calif., Sacramento—Pacific Gas & Electric Co., 245 Market St., San Francisco, granted permit to construct gas pipe line from Kern Co. oil fields to Milpitas, Santa Clara Co. with branches to San Jose, Oakland and San Francisco. $13,100,000. Private plans.

Oklahoma—Cimarian Utilities Co., Hooker, granted franchinse 30 mi. 4 in. natural gas pipe line from Tyrone to Forgan. $40,000. Private plans.

Tex., San Antonio—Woodmere Park Co., c/o L. S. Karren, Karren-Tobias Lumber Co., 1919 South Flores St., natural gas distributing system in 100 acre sub-division, Woodlawn addition; also paving through sub-division. $75,000.

Wash., Montesano—Washington Gas & Electric Co., Washington Court House, O., expending $100,000, extending gas mains in city.

SPORTS AND PARKS

Proposed Work

N. J., Jersey City—Hudson Co. Park Comrs., 921 Bergen St., preliminary plans rein.-con. outdoor swimming pool on Suckley Estate, North St., incl. grading, sodding. $75,000.

Contracts Awarded

Mo., Columbia—Bd. Curators University of Missouri, L. Cowan, secy., 1 story, 215 x 300 ft., rein.-con., brick field house, incl. running track, basket ball courts, to Bethel & Son Constr. Co., Granite City, Ill., $164,000. Est. $200,000. Noted July under "Unclassified."

N. J., West Orange (br. Orange), **N. J.**—Conable, Smith & Rawley, archts., 46 West 24th St., New York, general contract swimming pool, 1 story 75x105 St., brick pavilion, Hutton Park, to Louis Kilgus Co., 11 Coes Pl., Newark, for H. S. Scarritt, Hutton Park. Est. $75,000. Noted July 4.

Long Island City, N. Y.—G. U. Harvey, pres. Queens Boro, Queens Subway Bldg., public beach ocean front, from 126th to 149th Sts., to W. H. Gahagan, Inc., 147 Remsen St., Brooklyn, $397,230; boardwalk from Beach 56th to Beach 21st Sts., to D. M. W. Contg. Co., Avenue P, Brooklyn, $611,240. Noted June 20.

Tex., College Station—A. & M. College, rein.-con. athletic stadium, 33,500 seating capacity, to R. J. Windrow, College Station, and 5647 Swiss St., Dallas, $265,000. Noted July 18.

HEATING AND VENTILATING

Proposed Work

Mass., Provincetown — Provincetown Art Assn., W. H. Young, pres., 10 Carver St., heating system in art building, incl. addition to boiler room. $25,000 or more. Private plans.

Bids Asked

Mass., Somerville (br. Boston)—First National Stores, 5 Middlesex St., taking bids heating and ventilating system in storehouse, Mystic Ave. Monks & Johnson, 99 Chauncy St., Boston, engrs.

Contracts Awarded

Mass., Somerville (br. Boston)—First National Stores, 5 Middlesex St., heating and ventilating system in storehouse, Mystic Ave., to J. J. Hurley Co., 104 Bway., Boston.

ELEVATORS

Bids Asked

Miss., Oxford—Aug. 8, by W. C. Trotter, secy. State Building Comn., Jackson, elevators, refrigeration, cafeteria and hospital of University of Mississippi. F. P. Gates & Co., Jackson, engrs.

N. Y., Marcy—Sept. 4, by Commissioner Dpt. Mental Hygiene, Capitol, Albany, electric elevators and dumbwaiters, Marcy Div., Utica State Hospital; adv. E. N.-R. Aug. 1.

N. Y., Middletown—Sept. 4, by Commissioner Dpt. Mental Hygiene, Capitol, Albany, electric elevator and dumbwaiters, at Middletown State Hospital; adv. E. N.-R. Aug. 1.

N. Y., Poughkeepsie—Aug. 21, by Commissioner Dpt. Mental Hygiene, Capitol, Albany, electric elevator and dumbwaiters, Hudson River State Hospital; adv. E. N.-R. Aug. 1.

N. Y., Rochester—Sept. 4, by Commissioner Dpt. Mental Hygiene, Capitol, Albany, electric elevators in Buildings 1, 2 and 3, Rochester State Hospital; adv. E. N.-R. Aug. 1.

N. Y., Willard—Aug. 21, by Commissioner Dpt. Mental Hygiene, Capitol, Albany, electric elevators and dumbwaiter, Psychopathic Reception Building, Willard State Hospital; adv. E. N.-R. Aug. 1.

Contracts Awarded

Calif., Sacramento—State, passenger elevator, State Capitol Building, to Pacific Elevator & Equipment Co., 45 Rausch St., San Francisco, $23,170. Est. $24,000.

UNCLASSIFIED

Proposed Work

WATER POWER DEVELOPMENT—**Sacramento, Calif.**—L. B. Rouse, Pine Grove, granted permit to appropriate 8 c.f.s. from middle fork Mokelumne River, developing 445 hp. $25,000.

SHEDS—**Boston, Mass.**—New York, New Haven & Hartford R.R., E. Gakel, ch. engr., New Haven, Conn., plan 1 story train sheds, South Station, each $1,000,000. Private plans.

BULK STATION—**Middleboro, Mass.**—Shell Eastern Petroleum Products Co., 141 Milk St., Boston, bulk station, incl. 4 large tanks, $25,000 or more. Private plans.

TANKS—**Long Island City, N. Y.**—Sylvester Oil Co., 420 Lexington Ave., 4 oil tanks, 1319 Metropolitan Ave. $75,000. Private plans.

COAL POCKETS—**Long Island City, N. Y.**—Brandenburg Coal Co., 131-01 94th Ave., Jamaica, plans by G. Heise, 378 Cornelia St., Brooklyn, coal pockets, concrete, North Hempstead Spike near Belmont Race Track. $40,000.

TELEPHONE — **Washington and British Columbia**—Pacific Telephone & Telegraph Co., Telephone Bldg., Seattle, Wash., plans expending $200,000, two additional long distance telephone circuits between Seattle, Wash., and Victoria, B. C., incl. 54,000 ft. submarine cable.

Bids Asked

BOILER—**Knox, Ind.**—Aug. 5, by Bd. Comrs, Starke Co., boiler. $25,000. M. K. Rickett, co. aud.

CLARIFIER and COOLING SYSTEM—**Indianapolis, Ind.**—Aug. 5, by Bd. Comrs. Marion Co., clarifier and cooling system for asylum, one steam jacketed kettle for T. B. hospital $26,000. H. Dunn, co. aud.

COAL HOPPER—**Cambridge, Mass.**—Lever Bros., 164 Bway., taking bids coal hopper, concrete. C. T. Main, Inc., 201 Devonshire St., Boston, engrs.

POWER PLANT EQUIPMENT—**Oxford, Miss.**—Aug. 8, by W. C. Trotter, secy. Building Comn., Jackson, power plant equipment, smokestack, sewers, water, distributing piping, tunnels, conduits for University of Mississippi. F. P. Gates

DIESEL OIL ENGINE, etc.—**West Point, Miss.**—Aug. 7, by Bd. Aldermen, furnishing one L Diesel oil engine unit direct connected to 600 k.w. at 80 P.E. generator with exciter and all auxiliaries. Burns & McDonnell, 402 Interstate Bldg., Kansas City, engrs.

STOKERS—**Oakville, Tenn.**—Aug. 5, by Bd. Trustees, Oakville Memorial Sanitorium, L. W. Hughes, chn., 107 Porter Bldg., installing automatic underfeed stokers in connection with two 80 hp. H. R. T. boilers now installed.

REFRIGERATING PLANT—**Ottawa, Ont.**—Aug. 2, by S. E. O'Brien, secy. Dpt. P. Wks., refrigerating plant in National Research Council Laboratory, Sussex and John Sts.

REVETMENT WALL—**Owen Sound, Ont.**—Aug. 8, by S. E. O'Brien, secy. Dpt. P. Wks., Ottawa, Ont., revetment wall. $30,000.

Contracts Awarded

COAL POCKETS—**Gloucester, Mass.**—John Alden Coal Co., Inc., coal pockets, concrete, timber, handling equipment, to G. P. Carver Inc., 40 Central St., Boston.

TANK—**Lakeville, Mass.**—Dpt. P. Health, Boston, 75,000 gal. steel suction tank, to Pittsburgh-Des Moines Co., 50 Church St., New York. Noted July 11.

GREENHOUSES, etc.—**Lexington, Mass.**—W. E. Doran, East St., two 1 story 40 x 200 ft. steel, concrete, glass greenhouses, boiler house, to D. A. Stewart, 292 Lake St., Arlington.

COAL POCKET—**Brooklyn, N. Y.**—Delaware, Lackawanna & Western R.R. Co., G. J. Ray, ch. engr., 3rd Ave. and 25th St., South Brooklyn, 40 x 308 ft., coal pocket 34 ft. high, rein.-con., also steel shed, 29 ft. high, to Turner Constr. Co., Grand and Old Flushing Rd.

STEEL STACKS—**San Antonio, Tex.**—City, furnishing, erecting steel stacks for books in Carnegie Library, to Snead & Co., 36 Pine St., Jersey City, N. J., $30,223. Noted May 9 under "Buildings—Commercial."

MATERIALS

Bids Asked

CEMENT—**Los Angeles, Calif.**—Aug. 19, by Supervs. Los Angeles Co., 3,442,000 bbl. portland cement, used in San Gabriel Dam Project.

CABLE, etc.—**Elkhart, Ind.**—Aug. 6, by Bd. P. Wks., 10,500 ft. 6 conductor and 4,500 ft. 2 conductor No. 14 lead covered cable, 18¼ mi 12 copper clad wire, three ply, triple braided, insulated National code specifications; 1,500 No. 190 Pierce wide holders; 100 No. 5020 Pierce strain in. insulators; 1,500 ft. ½ in. galvanized conduit; 3,500 ft. R. C. No. 12 wire; 1 cast iron pole box 12x12x4 in. with hinged doors and gasket; 4 vac. M. lightning arresters; eighty-one 8 ft. x ¾ in. copper clad ground rods.

CULVERT PIPE—**Charles City, Ia.**—Aug. 13, at office Auditor Floyd Co., 1 carload culvert pipe. J. H. Curtis, Charles City, co. engr.

STEEL, etc.—**West Point, Miss.**—Aug. 6, by Bd. Supervs. Clay Co., eight I-beams, four channels, 15 in. 30 ft. long; fourteen I-beams, eight channels, 15 in. 40 ft. long; eleven I-beams, two channels, 18 in. 42 ft. long.

GRAVEL—**Winona, Miss.**—Aug. 6, by Montgomery Co., hauling 5,500 cu.yd. gravel 1 mi. and 22,750 units ½ mi. on Kilmichael-Powell's Ferry Rd.; 180,000 ft. creosoted timber and 10,450 ft. creosoted piling for bridge, on Kilmichael-Huntsville Rd., Big Black Bottom Dist.; 30,525 tons washed gravel on Kilmichael-Powell's Ferry, Kilmichael-Minerva, Scotland, Columbiana, Mulligan Springs, New Hope, Missions, Graysport and Fischer Rds.; hauling 14,850 cu.yd. gravel 1 mi. and 100,550 units ½ mi. on Scotlands, Columbiana, Mulligan Springs, Graysport, and Fischer Rds.

CEMENT, BRICK, etc.—**Jersey City, N. J.**—Aug. 6, by Bd. Comrs., City Hall, cement, brick, and sand. $25,000. C. A. Van Kenan, City Hall, engr.

BLUE PIG LEAD—**Jersey City, N. J.**—Aug. 6, by Bd. Council, City Hall, furnishing, delivering soft blue pig lead to Bureau of Waters, $5,000. C. A. Van Kenan, City Hall, engr.

ASPHALT—**New York, N. Y.**—Aug. 5, by P. J. Dooling, comr. Purchase, Municipal Bldg., asphalt to Dpt. Water Supply, Gas & Electricity.

ALUM—**Cushing, Okla.**—Mayor and City Council, in market 4 carloads alum, for City Water Plant.

FOREIGN

Chili—City of Santiago, awarded contract 30 blocks double track underground street railway to L. Lacarrique, Santiago.

Buildings

RESIDENTIAL

(Apartments unless otherwise noted)

Bids Asked

Calif., Oroville—G. A. Applegarth, archt, Claus Spreckels Bldg., San Francisco, taking bids 4 story, basement, concrete hotel, Bird St., for Oroville Inn Building Corporation. $300,000. Noted Feb. 7

Ill., Chicago—See "Contracts Awarded."

Ind., Evansville—H. E. Boyle & Co., archts., 405 Furn. Bldg., taking bids 4 story, basement, 50 x 140 ft., rein.-con., 1st and Walnut Sts., for Cambridge-Arms Apartments, Inc., 502 1st St. $200,000.

Mich., Detroit—J. Weingarden, 2949 Elmhurst Ave., taking bids and opens same about Aug. 8, 4 story, basement, concrete, brick, steel, plain found., Euclid Ave. $150,000. R. J. West, 1076 Penobscot Bldg., archt.

Mo., St. Louis—W. H. Schulte, Grand Blvd. and St. Louis Ave., taking bids 2 story, basement, 65 x 134 ft., rein.-con., brick, stone, Whittier St. E. J. Hess, 903 Title Guaranty Bldg., archt.

Mo., St. Louis—See "Contracts Awarded."

N. J., East Rutherford (mail Rutherford)—See "Contracts Awarded."

N. J., Elizabeth—See "Contracts Awarded."

Constr. News page 61

Buildings—Residential (Continued)

N. J., Pinewald—Sangor Hotel Corp., B. W. Sangor, pres., 60 Park Pl., Newark, taking bids on separate contracts 8 story, basement, 210x360 ft., brick, steel hotel, plain found., Crystal Lake Shore. $1,000,000. Former bids rejected. W. K. Oltar Jeoaky, 130 West 42nd St., New York, archt. Noted July 10.

N. J., Roselle—See "Contracts Awarded."

N. J., Somerville—G. Pomerantz, 26 North Gaston Ave., bids about Aug. 15, general contract 3 story, basement, 85 x 100 ft., brick, steel, plain found., Cliff St. and North Gaston Ave. $150,000. C. I. Goldberg, 921 Bergen Ave., Jersey City, archt. Noted July 25.

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., New York—Shelton Holding Corp., J. R. Lee, pres., 25 West 43rd St., bids about Sept. 22, separate contracts, 37 East 71st St. $2,225,000. R. Candela, 578 Madison Ave., archt.

N. Y., New York—See "Contracts Awarded."

Wis., Janesville—See "Contracts Awarded."

Ont., Toronto—See "Contracts Awarded."

Contracts Awarded

Calif., Los Angeles—Davis & Schiller, 5 story, basement, 50 x 175 ft., rein.-con., Carlton Way to C. C. Overpeck, 430 South La Brea Ave., $155,000.

Calif., San Francisco—L. J. Potter, 1958 Vallejo St., 10 story, basement, steel, concrete, Vallejo and Laguna Sts., to Mission Concrete Co., 270 Turk St., San Francisco, $165,000.

Ill., Chicago—McNally & Quinn, archts., 10 South Dearborn St., masonry and carpentry contract 20 story, basement, 90 x 150 ft., Dearborn and Maple Sts., to C. E. Erickson, 4753 Bway., cut stone, to E. E. Skoglund, 5555 Lincoln Ave., for C. A. Carlson, 4001 Sheridan Rd. Est. $2,000,000.

Ill., Chicago—Ronneberg, Inc., archts., 10 South La Salle St., masonry and concrete contracts 8 story, basement, 33 x 150 ft., to R. W. Meyer, 4192 Elston Ave., carpentry, to Halvorsen & Almquist, 5302 North Kedzie Ave., plumbing and heating, to Nilson Bros., 3222 North Halsted St., elevators, to Illinois Elevator Co., 2710 West Lake St., for M. L. E. Jensen, c/o architects. Est. $360,000. Noted June 6.

Ill., Chicago—Syndicate, c/o C. W. Nicol, archt., 308 South Michigan Ave., general contract 5 and 6 story, basement, 60 x 120 x 288 ft., rein.-con., brick, 915-17 Wilson Ave., to Fleisher Eng. & Constr. Co., 410 North Michigan Ave. General contractor takes bids about Sept , sub-contracts. Est. $1,500,000.

Mass., Boston—G. D. Zahm Corp., 551 5th Ave., New York, 16 story, basement, 105 x 115 ft., brick, steel, limestone hotel, plain found., Causeway St. corner Nashua St., to Blome-Sinck Co., 76 Monroe St., Chicago, Ill. Noted June 6.

Mich., Lansing—E. W. Sparro Hospital Assn., 325 Chestnut St., 3 story, basement, 75 x 145 ft., brick, steel nurses' home, Chestnut St., to Reinger Constr. Co., 127 North Cedar St. Est. $150,000. Noted Jan. 24.

Mo., St. Louis—H. C. Felter, 720 Chestnut St., 17 story, basement, 60 x 153 ft., rein.-con., brick, stone, terra cotta apartment, 2 story, brick, concrete garage, 4440 Lindell Blvd., separate contracts, $1,250,000. C. Oldenwald, 3957 A Tholozan Ave., archt.

N. J., Atlantic City—Boardwalk Hotels Corp., general contract 12 story, 80 x 301 ft., rein.-con., brick, steel, terra cotta hotel, to Day & Zimmerman, 112 North Broad St., Phila., Pa. Est. $1,000,000.

N. J., East Rutherford (mail Rutherford)—I. Choler, 315 Harrison St., Passaic, 3 story, basement, 50x100 ft., brick, steel, plain found., separate contracts, $150,000. Preiskel & Skvarla, 631 Main Ave., Passaic, archts. Noted July 25.

N. J., Elizabeth—Nine Hundred Twelve Grove St. Corp., 24 Commerce St., Newark, four 3 story, basement, 50 x 85 ft., brick, steel, plain founds., 912 Grove St., separate contracts, $175,000. Harris & Sohn, 58 Park Pl., Newark, archts. Noted July 25.

N. Y., Brooklyn—P. W. Connelly, 32 Court St., 6 story, 104 x 160 ft., Ocean Parkway and Avenue H, separate contracts and day labor, $350,000. B. Driesler, Jr., 153 Remsen St., archt.

N. Y., Brooklyn—P. W. Connelly, 32 Court St., 6 story, brick, timber, Newkirk Ave. and Westminster Rd., separate contracts and day labor. $350,000. B. Driesler, 153 Remsen St., archt.

N. Y., Brooklyn—H. Glaberson, 2401 Avenue I, 6 story, 87 x 100 ft., brick, timber, Humbett St., separate contracts, $150,000. Seelig & Finkelstein, 153 Pierrepont St., archts.

N. Y., Brooklyn—F. Montagna, 1565 West 5th St., two 2 story, one 25 Avenue E Bath Ave., and other 25th Avenue West Benson Ave., separate contracts and day labor. $200,000. Laspia & Somenfeld, 269 Bway., archts. $200,000.

N. Y., New York—Mauef Holding Corp., A. Ferman, pres., 1327 Merriam Ave., 6 story, 133 x 225 ft., brick, Merriam Ave. and 170th St., separate contracts. $600,000. H. Ginsberg, 205 East 42nd St., New York, archt. Noted July 18.

O., Cleveland—A. G. Simon, archt., Columbia Bldg., 3 story, basement, 90 x 132 ft., brick, incl. stores, to Mitzel Co., B. F. Keith Bldg., for J. F. Kofron, 1823 East 55th St. Est. $150,000. Noted June 13.

Constr. Notes page 62

Pa., Phila.—Bender Constr. Co., c/o I. W. Levin, archt., 1011 Chestnut Sts., 4 story, basement, 97 x 110 ft., rein.-con., brick, steel, plain found., Foulkrod and Leiper Sts., separate contracts. $150,000.

Pa., Phila.—Park View Corp., 228 South 40th St., 4 story, basement, 65 x 121 ft. and 40 x 121 ft., brick, steel, plain found., 1200 South 58th St., to S. Silverman, 228 South 40th St. Est. $300,000.

Wis., Janesville—S. Olson, 721 Belmont Ave., Chicago, Ill., general contract 6 story, 70 x 128 ft., brick, steel hotel, own forces; plumbing and heating, to Eagan Plumbing Co., Milwaukee. Est. $600,000. Noted May 23.

Ont., Niagara Falls — Hennepin Hotel Co., 1108 Royal Bank Bldg., Toronto, general contract, brick, stone, concrete, steel hotel, River Rd., to J. W. Butler Co. Ltd., Royal Bank Bldg., Toronto. Est. $750,000.

Ont., Toronto—H. Davidson, 3 story, basement, brick, stone, concrete found., Oriole Parkway, day labor, subletting mechanical trades, $300,000. Kaplan & Sprachman, 305 Dundas St. W., archts.

Ont., Toronto—Grimshaw Bros., 20 Bleeker St., 4 story, basement, brick, concrete, stone, Montclair Rd., day labor, $250,000. R. Card, 142 Chester St., archt. Noted Mar. 21.

CLUBS

Proposed Work

Conn., New Britain—Bd. Directors Y. M. C. A., Court and Main Sts., plans by Perry & Bishop, 17 Court St., new building, Main St. $500,000. Noted Feb. 7.

Ia., Des Moines—Des Moines Athletic Club, E. H. Riddle, mgr., sketches by Wetherell & Harrison, Shops Bldg., brick, stone, rein.-con., incl. halls, dining room, and swimming pool, 8th and Grand Aves. $1,000,000.

Kan., Topeka—Topeka Athletic Club, c/o J. R. Clark, 504 Natl. Reserve Life Insurance Bldg., sketches 10 story, basement, rein.-con., brick, stone athletic club, incl. swimming pool, auditorium, gymnasium, dining halls, $500,000.

N. J., Hackensack—Amer. Legion, c/o C. V. R. Bogert, archt., 210 Main St., 2 story, basement, brick, steel, plain found., 2nd St. $150,000.

Bids Asked

N. J., Plainfield—C. E. Wendehack, archt., 101 Park Ave., New York, bids about Aug. 15, 2 story, basement, brick, steel, stone addition, plain found., Warrenville Rd., for Watchung Valley Country Club, Warrenville Rd. $150,000. Noted July 25.

Wis., Eau Claire—Aug. 3, by C. Volkman, archt., 5 story, basement, 52 x 106 ft., brick, rein.-con., plain found., Scandinavian-American Fraternity.

Contracts Awarded

Wis., Kenosha—C. H. Walcott, archt., 431 North Michigan Ave., Chicago, Ill., general contract 4 story, basement, 121 x 151 ft., rein.-con., brick, stone, steel, to Immel Constr. Co., Fond du Lac, for Y. M. C. A., 2122 56th St. Est. $500,000. Noted May 30.

HOSPITALS

Proposed Work

Calif., Fresno—Fresno Co., D. M. Barnwell, clk., addition. $150,000 or more.

Ill., Granite City—St. Elizageths Hospital, c/o Sister Superior, bids in late fall on revised plans 4 story, basement, rein.-con., brick, stone addition, Madison St. $350,000. V. J. Klutho, 915 Syndicate Trust Bldg., St. Louis, Mo., archt. Noted Oct. 4, 1928.

Mass., Springfield—Springfield Hospital, 759 Chestnut St., plans by Stevens & Lee, 45 Newbury St., Boston, 7 story, 50 x 240 ft. hospital addition, and 2 story, basement, 60 x 200 ft. service building, both brick, limestone, plain founds. $1,200,000 funds being raised for same.

Mich., Eloise—Wayne Co., County Bldg., Detroit, plans by Maul & Lenz, 1257 David Whitney Bldg., Detroit, 5 story, basement, brick, rein.-con. infirmary, plain found, Michigan Ave. $500,000. Noted Mar. 28.

N. J., Paramus (mail Ridgewood)—Bd. Chosen Freeholders, Court House, Hackensack, soon takes bids general contract 2 and 3 story, basement, brick, steel, plain found., Bergen Pines. $150,000. C. V. R. Bogert, 210 Main St., Hackensack, archt., Noted May 8, under "Buildings Commercial."

N. Y., Binghamton — Our Lady of Lourdes Memorial, 160 Riverside Dr., bids in August, general contract hospital, nurses home, power plant. $455,000. Murphy & Lehman, 208 Livingston St., Brooklyn, archts. A. T. Lacey, Binghamton, archt. Noted June 7, 1928.

N. Y., Geneva—Bd Trustees Geneva General Hospital, M. S. Gaylord, pres., hospital.

N. Y., New York—Home of the Daughters of Jacob, c/o P. J. Schweitzer in charge, 270 West End Ave., plans hospital, home for aged, 167th St. and Teller Ave. $1,000,000. Maturity indefinite.

R. I., Providence — Bd. Hospital Comrs., Providence City Hospital, addition to Isolation Building, $150,000 or more.

Tex., Amarillo—Santa Fe R.R. Co., plans by G. A. Carlander, 1016 Fisk Medical Bldg., Amarillo, 5 and 7 story, brick, steel, rein.-con.

Va., Richmond—Medical College of Virginia, W. T. Sanger, pres., expending $2,500,000 improvements, incl. hospital unit $1,000,000 teaching unit $750,000, dormitory at St. Philip's Hospital $150,000, gymnasium, auditorium and recreational center $100,000.

Que., Montreal—King Edward Benefit Assn., H. Reubins, 5708 Clarke St., chn., hospital, $300,000.

Bids Asked

Mass., Belchertown—Aug. 6, by Dpt. Mental Diseases, State House, Boston, 3 story, basement, 45 x 110 ft., brick hospital, plain found., State school, for Commonwealth of Massachusetts. $150,000. Kendall, Taylor & Co., 142 Berkley St., Boston, archts.

Mass., Norfolk—Aug. 14, by Dpt. P. Health, 3 story, basement, brick, hospital and out patients department addition, plain found., Pondville Section, for Commonwealth of Massachusetts, $150,000. Steven & Lee, 45 Newbury St., Boston, archts.

N. Y., Brooklyn—Aug. 20, by W. Schroeder, Sr., comr. Dept. Hospitals, Municipal Bldg., New York, general contract elevators, refrigerators for Main Hospital Building, Kings County Hospital. L. P. Ward, Inc., 205 East 42nd St., New York, archt. Noted Feb. 21.

Pa., Warren—Aug. 23, by Commonwealth of Pennsylvania, Capitol, Harrisburg, additions to Reception Service Building, State Hospital. F. St. Clair, Jr., ch. engr.; adv. E. N. R. Aug. 1.

Ont., Sudbury—Aug. 6, by P. J. O'Gorman, archt., 4 story, basement, 50 x 185 ft. and 25 x 60 ft., brick, stone addition, concrete found., for St. Josephs Hospital, $200,000.

Contracts Awarded

Mass., Quincy—City Hospital Dept., 3 story, basement, brick, rein.-con. medical ward, to J. J. Gallagher Constr. Co., 17 Saville St. Est. $200,000. Noted July 11.

N. Y., Yonkers—St. Johns Riverside Hospital, Ashburton Ave., general contract 6 story addition, Palisades and Ashburton Aves., to Walter Kidde Co., 150 Cedar St., New York. Est. $750,000. Noted June 20.

Ont., St. Catharines—Niagara Peninsula Sanitarium, general contract 3 story, basement, brick, concrete, steel sanatorium, concrete found., to W. H. Copper, Clyde Blk., Hamilton. Est. $175,000.

Ont., Weston—R. Collinge, archt., 71 King St. W., Toronto, altering and constructing 3 story addition to nurses home, additions to main and domestic buildings, solarium, to Holtby Bros., 61 Hepburn St., Toronto, for Toronto Hospital for Consumptives, 225 College St. Est. $200,000.

Que., Three Rivers—Corporation of Cooke Hospital, 2 story, 44 x 196 ft., concrete, brick, steel, to B. J. Trepannier, Three Rivers, $208,000.

CHURCHES

Proposed Work

Calif., Los Angeles — Bethany Presbyterian Church, I. Ward, pastor, plans by H. C. Hartley, Subway Terminal Bldg., 3 story and part 4 story, 130 x 130 x 180 ft., brick, steel, rein.-con. church and Sunday school, Griffith Park and Lucile Aves. $150,000. Noted Mar. 28.

Calif., Marysville—Presbyterian Church Assn., 6 story, basement, incl. stores, apartment. Engineer and architect not selected. $250,000.

Mass., Holyoke—First Presbyterian Congregational Church, J. Allison, pastor, 215 Oak St., raising $150,000 or more funds, church, 237 Chestnut St. G. P. B. Alderman & Co., 316 High St., archts.

N. J., Irvington (br. Newark)—St. Leo's Parish, J. Buchmann, pastor, 103 Myrtle Ave., plans by R. J. Reilly, 12 East 41st St., New York, 2 story, basement, brick, steel convent and school, plain found., Myrtle and Madison Aves. $200,000 Noted June 6.

N. J., West New York—Owner, c/o F. J. Ricker, archt., 685 Hudson Ave., sketches 1 story, basement, brick, plain found. $150,000.

Bids Asked

Ill., Wheaton — Gary Memorial Methodist Episcopal Congregation, c/o J. H. Durand, Main St., bids about Aug. 10, 2 story, rein.-con., brick, limestone, Main and Wesley Sts. $200,000. Childs & Smith, 720 North Michigan Ave., Chicago, archts. Noted July 4.

Tex., Ft. Worth—First Methodist Episcopal Church Congregation, E. B. Hawks, pastor, taking bids brick, stone, steel, concrete found., 5th St. between Flower and Mason Sts. $500,000. W. G. Clarkson & Co., 1st Natl. Bank Bldg., archts. Noted July 11.

Contracts Awarded

Calif., Pasadena—First Baptist Church, rein.-con. Sunday school, Union St., to W. Crowell, 495 South Bway., $245,000.

Mass., Randolph — Protestant Episcopal Church, W. N. Bixby, pastor, 38 Marathon St., Arlington, 1 and 2 story, basement, brick church parish house, to J. F. Griffin Co., 250 Stuart St., Boston. $150,000 or more. Noted Apr. 11.

N. Y., New York—Congregation Talmud Torah Sons of Israel, 25 West 43rd St., 2 and 3 story, synagogue, to I. Thompson, 25 West 43rd St. Est. $150,000. Contractor taking bids on sub-contracts and materials. Noted July 18.

Churches (Continued)

O., Cleveland Heights (br. Cleveland)—First Church of Christ Scientist, C. W. Shimmon, pres., East 93rd St. and Euclid Ave., Cleveland, 1 story, brick, steel, concrete to Crowell & Little Constr. Co., 930 Hanna Bldg., Cleveland. Est. $500,000. Noted June 20.

Pa., Allentown—Muhlenberg College, 1 story, basement, stone, limestone chapel, plain found., to H. John Homan Co., 18th and Cherry Sts., Phila. Est. $250,000.

SCHOOLS

Proposed Work

Calif., Long Beach—City School Dist. plans by Dedrick & Bobbe, Heartwell Bldg., Long Beach, Harding Park School, brick, incl. auditorium. $175,000. Noted Apr. 4.

Calif., San Diego — State Building Comn., Sacramento, plans by G. B. McDougall, state archt., Sacramento, and bids about Sept. 15, rein.-con. additional buildings, State Teachers College. $450,000. Noted May 9.

Conn., Hartford—City, Northeast School Dist. soon takes bids 2 story, basement, 65 x 135 ft., brick, steel, incl. kindergarten, Hampton St. and Tower Ave. $150,000. Whiton & McMahon, 803 Main St., archts. Noted Apr. 25.

Conn., Norwalk—City, School Bd. plans by A. N. Paddock, 59 Seaview Ave., 2 story, brick, steel addition to Central Junior High School, 3 room addition to Marion St. School. To exceed $150,000. Noted Mar. 7.

Conn., Norwalk—City School Bd., City Hall, brick, steel, Strawberry Hill Sect. $150,000. Engineer and architect not selected.

Ill., Elmhurst—Bd. Educ. plans by J. C. Llewellyn & Co., 38 South Dearborn St., Chicago, 2 story, brick addition, incl. auditorium, gymnasium. $250,000.

Ill., Urbana—University of Illinois, chemistry building annex, on campus. $335,000 appropriated. C. H. Hammond, Capitol Bldg., Springfield, ch. superv. archt.

Ia., Sioux City — Sisters St. Francis, 645 Davis St., Dubuque, plans by Steele & Hilgers, United Bank Bldg., 3 story, basement, 50 x 150 ft., rein.-con., girls college, plain found., Briarcliffe St. $200,000.

Kan., Leavenworth—St. Marys Academy of Sisters of Charity, c/o Mother Superior, soon takes bids 4 story, basement, 121 x 212 ft., rein.-con., brick, stone academy, incl. 3 wings. $600,000. M. Carroll, 713 Linwood Blvd., Kansas City, Mo., archts. Noted July 4.

Mass., Amherst—Commonwealth of Massachusetts, Agricultural School, F. C. Kenney, rejected bids 2 story, irregular sized, brick, stone horticultural building. To exceed $150,000. Will revise plans and readvertise. J. H. Ritchie & Assoc., 250 Stuart St., Boston, archts. Noted July 11.

Mass., Boston—City, Schoolhouse Dpt., intermediate school, probably brick, limestone, Gilbert Stuart Dist. $150,000 or more. Engineer and architect not selected. Taking bids on land for exact site.

Mass., Boston—City, Schoolhouse Dept., Girls High School, limestone, plain found., Fenway. $1,500,000. Engineer and architect not selected.

Mass., Northampton—Northampton Commercial College, J. Pickett, pres., 76 Pleasant St., probably brick, stone, Gothic St. $150,000 or more. Engineer and architect not selected.

Mass., Plymouth—Town, O. L. Edes, chn. building comr., school, Lincoln St. $150,000 or more. Engineer and architect not selected.

Mass., Taunton—City, Pub. Property Comn., rejected bids 4 story, basement, 80 x 80 ft., brick, stone, steel high school addition, plain found., Washington St. $200,000. J. I. Higgins, Bordon Blk., Fall River, archts. Noted June 27.

Mich., Dearborn—Bd. Educ. plans by Van Leyen, Schilling & Keough, 3440 Cass Ave., 2 story, basement, brick, steel, stone, concrete high school addition, Jonathan and Ford Rds. $530,000.

Mich., Kalamazoo—Kalamazoo College plans by A. Embury, 150 East 61st St., New York, 2 story, basement, brick, rein.-con. library, plain found. $200,000. Noted June 20.

Miss., Greenville—School Bd., H. W. Starling, pres., 2½ story, 180 x 184 ft., brick, concrete, steel, Junior High School, Main St. $225,000 voted for same. N. W. Overstreet, Mississippi Fire Insurance Bldg., Jackson, archt.

Neb., Omaha—Creighton University, W. J. Agnew, pres., sketches by L. A. Daly, 622 Peters Trust Bldg., 4 story, basement, rein.-con., brick, stone faculty building, 25th and California Sts. $200,000.

N. J., Asbury Park—Bd. Educ., City Hall, sketches by E. A. Arend, Kinmouth Bldg., 3 story, basement, brick, steel school and gymnasium addition, plain found., Bangs Ave.

N. J., Linden—Bd. Educ., St. George Ave., will not build 2 story, basement, brick, steel addition to School 3, plain found., South Green Ave. $150,000. Project in abeyance. Noted June 20.

N. J., Middletown — Bd. Educ., Township Hall, plans by E. A. Arend, Kinmouth Bldg., Asbury Park, 2 story, basement, brick, steel, rein.-con., plain found., Fairview Sect. $150,000. Noted June 6.

N. J., Millburn—Bd. Educ., Twp. Hall, will not build 2 story, basement, brick, steel high school addition, plain found., Old Short Mills Rd. $650,000. Projects in abeyance. Noted May 8.

N. J., New Brunswick—Rutgers University, 3 story, basement, dormitory known as Wessels Memorial Hall. $225,000.

N. J., Toms River—Industrial Institute, 26 Court St., Brooklyn, N. Y., plans by W. S. Schneider, 1775 Bway., New York, 1st units technical college, Barnegat Bay. $500,000. Maturity in October.

N. Y., Brooklyn—Bd. Educ., 500 Park Ave., New York, plans by W. C. Martin, Flatbush Avenue extension and Concord St., 4 story, brick wings, Avenue M and East 52nd St. $415,000.

N. C., Winston-Salem — Salem College, Schools, H. Rondthaler, pres., plans by H. Upjohn, Grand Central Terminal Bldg., New York, 3 dormitories, on campus. $200,000.

N. D., Minot—State Bd. Administration, E. G. Wanner, secy., Bismarck, 2 rein.-con., brick dormitories, State Teachers' College. $150,000.

O., Youngstown—Bd. Educ. bids in January, 2 story, basement, brick, Magnolia and Madison Sts. $220,000.

Okla., Norman—University fo Oklahoma, W. B. Bizzell, pres., sketches rein.-con., brick, stone additions, incl. administration, economics, journalism, music, science, auditorium and laboratory buildings, $1,500,000.

Okla., Tulsa—First Christian Church, 9th and Boulder Sts., 4 story, basement, 100 x 140 ft., education building, 9th and Boulder Sts., $250,000. Engineer and architect not selected.

Tex., El Paso — Bd. Educ., c/o J. H. McBroom, pres., plans by O. H. Thorman & Co., and Braunton, McGee & Fraser, El Paso, schools, $600,000 voted for same.

Tenn., Knoxville—University of Tennessee, plans by Barber & McMurray, Tennessee General Bldg., 2 story, basement, 180 x 200 ft. library, $200,000.

Tex., Lubbock—Texas Technological College, library, on campus. $150,000 appropriated. W. C. Hedrich, 1st Natl. Bank Bldg., Fort Worth, archt.

Tex., San Antonio—Los Angeles Heights Ind. School Dist., plans by H. P. Smith, National Bank of Commerce Bldg., 3 story, 18,000 sq.ft. floor space, brick, steel, rein.-con. high school, incl. auditorium, stage, cafeteria, kitchen, domestic science, manual training, Redondo and Colonial Sts. $160,000. Noted July 4.

Utah, Salt Lake City—City School Bd. sketches high school, State St. $1,000,000. H. Barker, Salt Lake City, engr. Architect not selected.

Wis., Oshkosh — St. Vincent Congregation, plans by Lindl-Schuette, Inc., 82 East Wisconsin Ave., Milwaukee, 3 story, 100 x 134 ft., brick, plain found.

Ont., Kingston—Queens University plans by J. S. Archibald, Keefer Bldg., Montreal, Que., 2 story, brick, stone, concrete, steel gymnasium, incl. swimming pool. $250,000.

Ont., Newmarket — Pickering College, A. Rogers, chn., 387 Bay St., Toronto, dormitories.

Ont., Simcoe—Bd. Educ., 89 Talbot St., plans by F. C. Bodley, Temple Bldg., Brantford, 2 story, basement, brick, stone, concrete additions to North and South Ward Schools $175,000. Foundations for both schools awarded to Schultze Constr. Co., Ltd., Lawrence St., Brantford.

Bids Asked

Conn., Stamford—City, School Bd. taking bids 2 story, basement, brick, steel, Chestnut Hill. $150,000. Butler & Provost, 35 Atlantic St., archts. Noted May 23.

Ky., Murray—Aug. 8, by O. B. Irvan, secy. Bd. Educ., at office W. J. Caplinger, supt. Schools, High School Bldg., high school addition. Harry E. Boyle & Co., 405-406 Furniture Bldg., Evansville, Ind., archts.

Mass., Belmont—Town, School Building Com. taking bids 2 story, basement, brick addition to Junior High School, plain found., Washington and Oakley Sts. H. T. Underwood, 46 Cornhill, Boston, archt. French & Hubbard 210 South St., Boston, engrs. $260,000.

Mo., St. Louis — Bethlehem Evangelical Lutheran Congregation, J. Franz, pastor, 2144 Salisbury St. bids about Feb. 1, 3 story, basement, rein.-con., brick, stone, incl. social center, 2151 Salisbury St. $150,000. A. Meyer, 1223 Central Natl. Bank Bldg., archt. Noted May 9 under "Buildings Educational-Religious."

N. J., Elizabeth—Bd. Educ. bids about Aug. 15, 2 story, basement, brick, steel addition to School 17, plain found., Bayway. $150,000. H. B. Brady, 333 North Broad St., Elizabeth, archt. Noted June 20.

N. J., Jersey City—Bd. Educ., Harrison Ave., bids about Aug. 15, general contract 2 story, basement, brick, steel, rein.-con., High School addition, plain found., Palisades Ave. $450,000. J. T. Rowland, Jr., 30 Journal Sq., archt. Noted Mar. 7.

O., Portsmouth—Aug. 9, by W. Chazelbeck, clk. Bd. Educ., George B. Scudder Junior High School, 2 story, basement, 128 x 148 ft., concrete, brick, stone, incl. auditorium and gymnasium. $225,000. R. Wile, Portsmouth, and W. B. Ittner & Co., 911 Locust St., St. Louis, Mo., archts. Noted July 4 under "Buildings Educational."

O., Youngstown—Bd. Educ., bids about Oct. 20, Junior High School, 2 story, basement, brick, steel, concrete, incl. auditorium, cafeteria, gymnasium, Hilman St. $400,000.

Okla., Tulsa—Aug. 5, by University of Tulsa, c/o J. D. Finlayson, 4 story, basement, 88 x 126 ft., brick, stone, Petroleum Engineering School, plain found., 6th and College Sts. To exceed $150,000. H. C. Hibbs, American Trust Bldg., Nashville, Tenn., archt. Noted June 20.

Contracts Awarded

Calif., Los Angeles—University of Southern California, 3 story, basement, 250 x 300 ft., brick, steel, rein.-con., gymnasium, swimming pool, to Scofield-Swimmerton Co., 1100 Pacific Finance Bldg., $500,000. Noted July 25.

Ill., Rock Island—Villa De Chantel, Sisters of Visitation, c/o M. O. Bonno, 20th St. and 18th Ave., 4 story, rein.-con., brick, stone academy, 20th St. and 16th Ave., to C. H. O. Stark Constr. Co., Cedar Rapids, Ia.; plumbing, to Channon & Dufva, Rock Island; heating, to Kale-McKay Co., Rock Island. Est. $200,000.

Ia., Estherville—Bd. Educ., Des Moines, A. Mahlum, secy., general contract Junior High School, 2 story, part basement, 130 x 200 ft., rein.-con., brick, stone, plain found., to Spencer Constr. Co., Spencer, $136,800. Noted July 4.

Ia., Estherville — Bd. Educ., 2 story, part basement, 130 x 200 ft., brick, stone, to Spencer Constr. Co., Spencer, $136,800.

Mass., Boston—City, Library Dpt., 3½ story, basement, brick, library, plain found., to Casper Ranger Constr. Co., 129 Newbury St. Est. $150,000. Noted June 20.

Mass., Brookline—Beaver County Day School, Inc., E. R. Smith, headmaster, 3 story, basement, 85 x 150 ft., brick, stone addition, plain found., to Wm. Coulson Co., 238 Main St., Cambridge. Est. exceeds $150,000. Noted July 11.

Mass., Leominster—City, c/o M. A. Dyer Co., archt., 1 Beacon St., Boston, repairing, reconstructing brick, high and grade schools, to T. A. Cassidy, 54 Boylston St., Fitchburg. Est. $150,000 or more.

Mass., Medford—City, School Bldg. Com., 3 story, basement, 65 x 240 ft., and 65 x 115 ft., brick addition to Senior High School, plain found., Forest St., to Frankini Bros., Inc., 30 Mystic Ave. Est. $600,000; heating and ventilating, to Reardon Bros., 341 Union St., Lynn, $117,747.

Mich., Detroit—Bd. Educ., 1354 Bway. Ave., 2 story, basement, 76 x 180 ft., brick, steel, rein.-con., to Culbertson & Kelly, 872 West Milwaukee Ave., $128,890; heating, to Freyn Bros., 6346 Michigan Ave., $37,677. Noted July 18.

Mich., Detroit—Bd. Educ., 1354 Bway. Ave., 1 and 3 story, basement, 80 x 117 ft., brick, steel, rein.-con., to M. A. Mahoney, 161 Grixdale Ave., $182,700; heating, to Freyn Bros., 3850 Michigan Ave., $39,887. Noted July 18.

Mich., Petoskey—R. D. Engle, secy. Bd. Educ., 2 story, basement, 158 x 183 ft., concrete, brick, steel, stone, plain found., to J. W. O'Connor, 160 South Prairie St., Kalamazoo. Est. $175,000. Noted July 11 under "Buildings Educational."

N. J., Chester—Bd. Educ., general contract 2 story, basement, brick, steel, rein.-con., plain found., to Smith & Hoffman, Chester. Est. $150,000. Noted May 16.

N. J., Sayreville—Bd. Educ., Boro Hall, general contract 2 story, basement, brick, steel, plain found., to J. Check, Jr., 59 Main St., South River. Est. $150,000. Noted June 27.

N. Y., Watertown — Bd. Educ., 5th Ward School, to J. F. Charlebois, Chamber of Commerce Bldg., Watertown. Est. $212,000. Noted Jan. 31

N. C., Raleigh—Augustine College, college buildings, incl. dining hall, dormitory, nurses home, 3 story, brick, also 2 story library, to J. N. Bryan, Raleigh. Est. $185,000.

Ore., Portland—School Bd., c/o G. W. Jones, archt., City Hall, 3 story, basement, 100 x 200 ft., rein.-con., to R. B. Hammond, Portland. $247,000.

Vt., Springfield—Superintendent Schools, 2 story, basement, 85 x 225 ft., brick, stone, steel high school, to W. J. Handley Co., 280 Main St., Fitchburg, Mass., $299,500. Noted June 27.

THEATERS

Proposed Work

Mass., Boston—C. Canner, 45 Milk St., revised plans by Krokyn, Browne & Rosenstein, 120 Milk St., 2 story, basement, brick, stone, steel, incl. stores, dance hall, Mattapan Sq. $600,000. Former bids rejected. N. E. Theatre Operating Co., Spinanski, pres., 19 Mild St., lessee. Noted June 20.

Mass., Fall River—W. J. Dunn, 65 Academy Bldg., South Main St., soon takes bids remodeling 1 and 2 story, basement, brick, steel, plain found., South Main, Pleasant and 2nd Sts. E. G. Bullard, 908 Purchase St. New Bedford, archt.

Pa., West Chester—Warner Bros. Pictures, A. Meyers in charge, 321 West 44th St., New York, plans by Hoffman-Henon Co., 1428 South Penn Square, Phila., theatre. $300,000. Noted July 11.

Constr. News page 63

Theaters (Continued)

Ont., Sudbury—Famous Players of Canada, Ltd., Royal Bank Bldg., Toronto, theatre, $250,000.

Que., Montreal—Consolidated Theatres Corp., Ltd., 12 Mayor St., soon lets contract, St. Catharine St. E. T. W. Lamb, 644 8th Ave., New York, archt. Noted May 23.

Bids Asked

Calif., Los Angeles—D. S. Bushnell, archt., Finance Bldg., Whittier, taking bids rein.-con., steel, incl. stores, offices, Somerset Ave., for S. E. Woodruff, c/o architect, $150,000.

Ill., Chicago—Rapp & Rapp, archts., 190 North State St., taking bids 1 high story, balcony, 111 x 116 ft. with 40 x 122 x 132 ft. entrance, brick, steel, Lawrence and Lipp Aves., for Balaban & Katz, 175 North State St. $250,000.

Mass., Athol—Aug. 5, by Mowll & Rand, archts., 21 School St., Boston, 1 story, basement, brick, steel, plain found., Main St., for Goldstein Amusement Co., 103 Bridge St., Springfield. $150,000. Noted July 25.

BANKS

Proposed Work

Conn., Waterbury—Merchants Trust Co., 67 Bank St., brick, steel, Leavenworth St. $150,000 or more. Engineer and architect not selected.

Mass., New Bedford—Luzo Corp. of America, c/o L. L. Lebrode, archt., Olympia Bldg., 1 story, basement, brick, steel, plain found., River and Purchase Sts. $150,000.

N. J., Point Pleasant—Point Pleasant Beach Natl. Bank, plans by Tilgham Moyer Co., 141 North 9th St., Allentown, Pa., 1 story, basement, brick, steel, plain found. $150,000. Noted July 25.

O., Niles—Walker & Weeks, archts., 2341 Carnegie Ave., Cleveland, soon lets contract 2 story, basement, 21 x 98 ft., and 45 x 98 ft., stone, steel, concrete, incl. offices, for Niles Trust Co. $200,000. Noted June 13.

Que., Sherbrooke—Bank of Montreal 3 story, brick, stone.

Contracts Awarded

Ill., Chicago—Mundie & Jensen, archts., 39 South La Salle St., general contract 7 story, 57 x 127 ft., brick, limestone, incl. offices, to McLennan Constr. Co., 307 North Michigan Ave., for West Town State Bank, 2354 West Madison St. Est. $750,000. Noted May 16.

OFFICES

Proposed Work

Calif., Los Angeles — Ferguson Corp., c/o Walker & Eisen, archts., Western Pacific Bldg., 13 story, basement, 97 x 115 ft., steel, rein.-con., incl. stores, 6th and Flower Sts. $1,500,000.

Conn., Hartford—State, plans by Smith & Bassette, 36 Pearl St., 5 story, basement, 186 x 324 ft., steel, brick, Washington and Capitol Aves. $2,250,000. Noted July 25.

Ia., Sioux City—Frances-Orpheum Building Co., Frances Bldg., 4 story, 100 x 200 ft. addition, 6th and Pierce Sts. $150,000.

N. H., Claremont—J. P. Goddard Realty Co., revised plans by F. L. Austin, 240 College St., Burlington, Vt., 3 story, basement, 50 x 165 ft., brick, marble, incl. stores, plain found. Pleasant St. $150,000. Former bids rejected. Noted June 6.

N. J., Jersey City—Wahlgold Realty, Inc., c/o J. T. Rowland, Jr., archt., 30 Journal Sq., sketches 14 story, basement, brick, steel, plain found., Journal Sq. $500,000.

N. Y., New York—H. Mandel Associates, 10 East 40th St., plans by Farrar & Watmough, 10 East 40th St., 18 story, brick, steel, incl. storage, 7th Ave. and 16th St. $750,000.

O., Toledo—Electric-Auto Lite Co., Champlain St., plans by A. Hahn, Close Realty Bldg., office building, Champlain St., $275,000.

Ore., Portland—British American Consolidated Properties, Ltd., Toronto, Ont., plans by H. C. Bertelson, Hyde Bldg., Spokane, Wash., 14 story, double basement, 100 x 100 ft., Bway. and Stark St. $1,000,000

Pa., Pittsburgh—National Union Fire Insurance Co., 139 University Pl., plans by A. Garfield, Natl. City Bldg., Cleveland, O., 7 story, brick, stone, steel, concrete, $500,000.

Ont., New Toronto—Anaconda American Brass Co. Ltd., 8th Ave., plans by Sproatt & Rolph, 1162 Bay St., Toronto, 2 story, 48x120 ft., concrete, brick, steel, stone. $500,000.

Que., Montreal—James T. Stanger & Co., 190 St. James St., plans by E. Flagg, 111 East 40th St., New York, 19 story, brick, limestone, $500,000.

Bids Asked

Fla., Jacksonville—T. S. Roberts, 902 Riverside Ave., taking bids sub-contracts 7 story, basement, 40 x 90 ft., brick, steel, plain found., Adams St. $200,000. Former bids rejected. N. W. Green, Jacksonville, engr. M. C. Greeley, 111 West Adams St., archt. Noted Apr. 4.

Constr. News page 64

Mass., Boston—Edison Electric Illuminating Co., 39 Boylston St., taking bids altering and constructing 10 or more story, brick, stone, steel addition, plain found. $600,000. Bigelow, Wadsworth, Hubbard & Smith, 11 Beacon St., archts. Noted Mar. 14.

N. Y., Long Island City — T. R. Eilenberg, archt., 40-22 Lawrence St., Flushing, taking bids foundation 9 story, 125 x 223 ft., brick, steel, Roosevelt Ave. and Lawrence St., for New York & Queens Light & Power Co., Bridge Plaza. Bids after Sept. 1, super-structure for same. $1,075,000. Noted July 18.

N. Y., New York—Syndicate, headed by J. G. Siegel, owner and contractor, 343 Madison Ave., taking bids 19 story, office on 50 x 100 ft. site, 57th St. and Madison Ave., Buchman & Kahn, 2 Park Ave., archts. Noted June 11.

Pa., Pittsburgh—Aug. 7 (selected list), by A. Garfield, archt. National City Bldg., Cleveland, O., 7 story, basement, brick, steel, stone, University Pl. $600,000. J. P. Jones Hunkin Conkey Bldg., Cleveland, O., mech. engr. Noted July 11.

Tex., San Antonio—C. N. Bassett, State Natl. Bank Bldg., El Paso, taking bids 13 story, basement, brick, steel, rein.-con., 60,000 ft. floor space. $500,000. Trost & Trost, Two Republics Bldg., El Paso, archts.

Contracts Awarded

Calif., Santa Monica—Bay Cities Guaranty Building & Loan Assn. 12 story, basement, steel, rein.-con., incl. stores, to C. Thoren, 5615 West 4th St., Los Angeles, $500,000. Noted May 23.

Ill., Chicago—Burnham Bros., archts., 160 North La Salle St., general contract 60 story, basement, 69 x 89 ft., rein.-con., brick, caisson found., 151-157 North Michigan Ave., to O. W. Rosenthal-Cornell Co., 228 North La Salle St., for J. T. Cuneo, 2242 Grove St. Est. $8,000,000.

Mass., Boston—Jordan Estate, c/o E. L. Rawson, archt., 246 Washington St., reconstructing 4 story basement, brick, steel, plain found., to W. H. Preble Co., 11 Pemberton Sq. Est. $150,000 or more.

Mass., Boston—Lamson & Hubbard Corp., 350 Boylston St., 6 story, basement, 30 x 125 ft. brick, limestone, marble, plain found., to L. P. Soule & Sons, 80 Boylston St., for Garden Realty Co., c/o Lamson & Hubbard Corp. Est. exceeds $150,000. Noted July 11.

Mass., Boston—S. J. Lowe, 1 State St., 3 story, basement, 60 x 115 ft., brick, steel, incl. stores, plain found., to Olympia Constr. Co., 333 Washington St. Est. $150,000 or more. Noted Apr. 18.

Mass., Needham—A. T. Nelson, 1 Federal St., Boston, 2 story, basement, 75 x 145 ft., brick, incl. stores, Great Plain Ave., to G. B. H. Macomber Co., 38 Chauncy St., Boston. Est. $150,000. Noted July 11.

Minn., Minneaolis—See "Stores."

Mo., St. Louis—Missouri Pacific R.R. Co., 1228 Olive St., remodeling ground floor and basement, 23 story, basement, Olive and 13th Sts., to Humes Deal Co., Arcade Bldg. Est. $150,000.

Neb., Omaha—Northwestern Bell Telephone Co., 1906 Douglas St., 15 story, basement, 19th and Douglas Sts., to Peter Kiewits & Sons, 908 Omaha Natl. Bank Bldg. Est. $250,000.

N. Y., Buffalo—Pratt & Lambert, 79 Tonawanda St., 6 story addition, to C. Berrick Sons, 1152 Main St. $150,000.

Ont., Toronto—Eighty Richmond St., W. Ltd., 80 Richmond St. W., general contract 25 story, basement, 74 x 106 ft., rein.-con., brick, stone, to Simcoe Constr. Co. Ltd., Concourse Bldg. Est. $1,000,000.

STORES

Proposed Work

Ill., Decatur—H. Lavigne, 11 South La Salle St., Chicago, soon takes bids 3 story, basement, 59 x 116 ft., concrete, brick. Nimmons, Carr & Wright, Chicago, archts. Sears, Roebuck & Co., Arthington and Homan Sts., Chicago, lessee.

Ia., Sioux City—A. Willeges, 310 Pierce St., plans by Steel & Hilgers, United Bank Bldg., 3 story, basement, 50 x 150 ft., rein.-con., plain found., 627 Pierce St. $200,000.

Bids Asked

Ill., Chicago—Stanton & Hogdon, archts., 307 North Michigan Ave., bids about Aug. 7 (invitation only), 3 story, basement, 125 x 212 ft., brick, Laramie St. and Chicago Ave., for C. A. Mueller, c/o architects. $400,000. Noted June 27.

Ill., Moline—Aug. 14, by W. H. Schulzke, archt., 506 15th St., 4 story, basement, 40 x 150 ft., rein.-con., brick, terra cotta commercial, 5th Ave. between 14th and 15th Sts., for W. J. Talty. Hadley Furniture Co., lessee.

N. J., Morristown—M. Epstein, 32 Park Pl., Newark, bids about Oct. 1, general contract 6 story, basement, brick, steel, plain found., 32 Park Pl. $225,000. Warren & Warren, 31 Clinton St., Newark, archt., P. Shaw, 24 Commerce St., Newark, engr. Noted May 23 under "Buildings Commercial."

Tex., San Antonio—J. C. Sullivan, c/o Berretta-Stiles Co., engrs., c/o Natl. Bank of Commerce Bldg., taking bids remodeling 4 story building, Houston St. between St. Marys and Navarro Sts. $200,000. H. L. Page, 2011 Torcido Dr., archt.

Contracts Awarded

Minn., Duluth — G. G. Hartley Estate, C. Hartley, 740 East Superior St., general contract 3 story, brick, 2nd Ave. E. and Superior St., to G. Loundsberry & Son, 322 East Superior St. $175,000.

Minn., Minneapolis—W. B. Foshay Co., 9th St. and 2nd Ave., general contract 2 story, basement, sub-basement, 165 x 330 ft., rein.-con., brick, steel, bedford stone, incl. office and garage, to Natl. Contg. Co., 311 Metropolitan Bank Bldg. Est. $500,000. Noted July 18, under "Buildings Commercial."

N. Y., New York—Reformed Church of Harlem, 162 East 122nd St., incl. storage, 204 West 123rd St., to W. Kiehnle, 3606 Park Ave. Est. $150,000. Noted May 16.

LOFTS

Proposed Work

N. J., Jersey City—Owner, c/o C. H. Ziegler, archt., 75 Montgomery St., will not build 3 story, basement, brick, steel, plain found., lofts, incl. stores, Journal Sq. and Hudson Blvd. $150,000. Project abandoned. Noted July 18.

Ont., Toronto—Wagman, Wagman & Weinstock, c/o Kaplan & Sprachman, archts., 305 Dundas St. W., 4 story, basement, brick, concrete, Spadina Ave. $175,000.

Bids Asked

N. J., Perth Amboy—B. Goldberger, archt., 117 Smith St., bids about Aug. 15, general contract 3 story, basement, incl. stores, plain found., State St., for C. I. Silk, 189 Rector St. $150,000. Noted July 18.

Contracts Awarded

N. Y., New York—Marx Hall, c/o Gronenberg & Leuchtag, archts., 1385 Bway., altering 10 story, 232-250 West 37th St., to H. R. H. Constr. Co., 9 East 40th St. Est. $250,000.

PUBLIC

Proposed Work

Mass., Boston—CITY HALL—City soon takes new bids on revised plans altering 5 story, basement, brick, stone, steel. $150,000.

Mass., Boston—PRISON—City, Penal Institutions Dpt., 2 or more story, brick, steel, concrete, Deer Island, Boston Harbor. $150,000.

Mass., Northampton—COURT HOUSE—Comrs. Hampshire Co., C. E. Hodgkins chn. rejected bids 2 and 3 story, basement brick, stone addition, Main St. Will probably revise plans and readvertise. Putnam & Stuart, 78 Main St., archts. Noted May 30.

Mich., Detroit—ARMORY—Michigan Naval Militia, 7456 East Jefferson Ave., plans by Stratton & Hyde, 904 Marquette Bldg., 4 story, basement, 140 x 310 ft., brick, steel, rein.-con., plain found., East Jefferson Ave. $500,000.

N. J., Bayonne—MUNICIPAL—Bd. Comrs., City Hall, 4 story, basement, brick, steel, plain found., Avenue C. between 27th and 28th Sts., $250,000. Project in abeyance. P. A. Vivattas, 110 48th St., Union City, archt. Noted June 28.

N. J., Elizabeth — MUNICIPAL — Bd. City Comrs., City Hall, will not build 4 story, basement, brick, steel, plain found., Morrell St. Project in abeyance. $1,000,000. Noted June 28.

N. C., High Point—MUNICIPAL—City, C. A. York, mayor, plans by H. Barton, Jefferson Standard Bldg., Greensboro, 3 story, basement, 50 x 100 ft. addition to present building. $150,000. Noted July 11.

Ont., Ottawa — COURT — Dpt. P. Wks., Parliament Buildings, supreme court building, Elgin and Albert Sts. $250,000 or more. T. W. Fuller, c/o owners, archts.

Ont., St. Catharines — CITY HALL — City plans by Nicholson & McBeth, 46 Queen St. E., and T. H. Wiley, 1282 St. Paul St., 3 story, basement, 62 x 132 ft., stone, concrete, brick, steel, $250,000. Noted July 25.

Bids Asked

Tex., Waco—CITY HALL—Aug. 20, by City, c/o E. E. McAdams, mgr., 2 story, brick, stone, rein.-con. $225,000. H. L. Spicer, Amicable Bldg., archt.

B. C., Kimberley—PUBLIC—Aug. 13, by S. E. O'Brien, secy. Dpt. P. Wks., Ottawa, Ont., public building.

Contracts Awarded

Ill., Dwight—REFORMATORY—State of Illinois, Capitol Bldg., Springfield, 5 cottages, alterations, additions to Women's Reformatory, to V. Jobst & Son, Lehman Bldg., Peoria, $200,650; heating, to J. P. Shields, Bloomington, $26,433. Noted June 13.

Wiring, to C. Perdam, Macomb, $3,247.

Mass., Springfield—CITY HALL—City, Mayor's Office, City Hall, annex, Court St. and Bway. $150,000. Owner builds.

UNCLASSIFIED

Bids Asked

Mich., Dearborn—EXCHANGE—Aug. 8, by Smith, Hinchman & Grylls, archts., 800 Marquette Bldg., Detroit, 2 story, basement, 95 x 130 ft., brick, steel, rein.-con., plain found., Ford Rd., for Michigan Bell Telephone Co., 1365 Cass Ave. $750,000. Noted June 20.

Mich., Grand Rapids—WAREHOUSE—By T. N. Lacy, Michigan Bell Telephone Co., 7 Fountain St., N.E., Detroit, soon lets contract 1 story, part basement, 131 x 736 ft. warehouse and garage, 30 x 75 ft., loading dock 26 x 312 ft., driveway, brick, steel, rein.-con., plain found. Division St., Smith-Hinchman & Grylls, 800 Marquette Bldg., Detroit, archts.

N. J., Elizabeth—TELEPHONE—Voorhees, Gmelin & Walker, archts, 101 Park Ave., New York, taking bids general contract 5 story, basement, 60 x 100 ft., brick, steel, addition, plain found., East Grand St., for New Jersey Telephone Co., 540 Broad St., Newark. $150,000. Noted June 20 under Buildings Commercial.

New York—Aug. 22, by Superintendent Div. State Police, Executive Dpt., 190 State St., Albany, barracks Westchester Co. adv. E.N.-R. Aug. 1.

N. Y., New York—SOCIAL CAFETERIA, etc.—Hunter College, c/o E. H. Elliott, Park Ave. and 69th St., bids in about 6 weeks, general contract 4 story social building, cafeteria, boiler unit, Jerome Park, Reservoir and Goulding Aves. $800,000. Thompson Holmes & Converse, archts. Werner Nygren, heating and ventilating engrs. Kaiser, Muller & Davis, electrical engrs., all 101 Park Ave. Noted May 30.

O., Dayton—HOME FOR AGED—Nazareth Home for the Aged soon t akes bids 3 story, basement, 60 x 120 ft., brick, rein.-con., plain found., Salem Pike. $150,000. W. L. Jackle, 310 West 2nd St., archt.

Ont., Hamilton—STATION—Canadian Natl. Rys., New Union Sta., Toronto, T. T. Irving, ch. engr., bids in fall concrete, brick, steel. $1,000,000. J. Schofield, 340 Balantyn St., Montreal, Que., archt. Noted Jan. 5 under "Buildings—Commercial."

Contracts Awarded

Ia., Des Moines—STATION—Chicago, Rock Island & Pacific R.R. Co., La Salle St. Station, Chicago, Ill., remodeling 1 and 2 story, 21 x 250 ft. station, 620 ft. concrete platform, 1,000 ft. steel canopy, to A. H. Neuman & Co., 522 Hubbell Bldg. Est. $160,000. Noted Dec. 15, 1927.

Mass., Fall River — ORPHANAGE — St. Joseph's Roman Catholic Orphanage, St. Joseph's St., 5 story, basement, brick, steel, plain found., St. Joseph's St., to S. Boucher, 479 Whipple St. Est. $500,000.

Minn., Minneapolis—WAREHOUSE—National Tea Co., C. H. Landin, vice-pres., 2837 3rd Ave. S., general contract 3 story, basement, brick, timber, to Standard Constr. Co., 1111 Plymouth Bldg., $131,000. Noted July 4.

N. J., Newark—WAREHOUSE—New Jersey Wholesale Drug Co., 158 Arlington St., general contract altering and constructing 4 story, basement, rein.-con., brick addition, plain found., to Newark Constr. Co., 164 Market St. Est $159,000.

N. J., South Orange—COMMUNITY HOUSE—South Orange Community House, C. Baird, pres., Mead St., altering and constructing 2 story, basement, brick, steel addition, plain found., to J. Christianson, Mead St. Est. $150,000. Plumbing to Ruehl & Hatfield, Inc., 384 South 10th St., Newark; heating, to J. M. Knuth, 1857 Springfield Ave., Hilton.

O., Cleveland—WAREHOUSE—Nickel Plate Development Co., C. Conley, engr., Terminal Tower, 2 story, 50 x 201 ft., brick, timber, to W. Dunbar Co., 8201 Cedar Ave. Est. $150,000. Pillsbury Flour Mills Co., B. B. Butler, mgr., 612 Engineers Bldg., lessee. Noted Feb. 7.

Industrial—Buildings

FACTORIES AND MILLS

Proposed Work

Calif., Los Angeles—Hollywood Casket Co., 1024 Orange Dr., plans by Pope & Burton, 404 Beaux Arts Bldg., 2 story, 88 x 200 ft., brick, steel, rein.-con. factory, 1024 Orange Dr. $50,000.

Calif., Los Angeles—Los Angeles Brush Co., 2208 East 37th St., plans by R. D. King, Van Nuys Bldg., 1 and 2 story, 105 x 110 ft., brick factory, East 37th St.

Calif., Oakland—Atlas Glass Co. Ltd., represented by B. F. Woolner, atty., 1st Natl. Bank Bldg., glass factory. $250,000 or more.

Conn., Beacon Falls—H. D. Bronson Co. plans by W. E. Hunt, 182 Church St., Torrington, 2 story, 35 x 100 ft., brick manufacturing unit. $45,000.

Mass., Chelsea (br. Boston)—Inter-Continental Pipe & Mining Co., H. Kennedy, pres., 475 5th Ave., New York, sketches manufacturing plant, Eastern Ave., at Waterfront. $3,000,000. Fay, Spofford & Thorndike, 44 School St., Boston, engrs. Noted May 16.

Mo., St. Louis—H. E. Foster, engr. and archt., 400 West Madison Ave., New York, soon takes bids general contract assembly and service, Jefferson Ave. and La Salle St., for Hack-International Truck Co., 3300 Wentworth Ave., Chicago, Ill. $250,000.

N. J., East Rutherford (br. Rutherford)—L. B. Huesmann, archt., 167 Stuyvesant Ave., Lyndhurst, rejected bids general contract 2 story, basement, 50 x 130 ft., brick, steel factory, plain found. Boiling Springs Ave. and Orchard St., for Keystone Falicon Press, Inc., 15 Ames Ave., Rutherford. $70,000. Noted June 6.

N. Y., Brooklyn—Amerford Realty Corp., O. Stolp, pres., 2726 Bedford Ave., plans by J. Ingiversen, 1516 Flatbush Ave., 153 x 200 ft., brick, concrete factory and storage, Albany St. and Avenue H. $100,000.

N. Y., New York—H. Fuldner & Sons, Inc., 404 East 14th St., rein.-con., $500,000. Project to go ahead in 1930. Engineer and architect not selected. Noted Mar. 8, 1928.

N. Y., New York—Warner Hudnut Corp., 113 West 18th St., plans by G. A. Boehn, 2 West 45th St., altering 150 x 1814 ft., brick, 113 West 18th St. $400,000.

N. C., Wilmington—Thompson Lumber Co., Wilmington, leased 17 acre tract, large plant.

O., Cleveland—Lindsay Wire Weaving Co., H. L. Lindsay, pres., 14025 Aspinwall Ave., plans by Bohnard & Parsson, 1900 Euclid Ave., 2 story, 49 x 122 ft., brick, steel factory addition. $50,000.

O., Salem—Mullins Mfg. Co., Depot St., soon takes bids 1 story, 104 x 202 ft., brick factory, Depot St. $60,000. Private plans.

Pa., Phila.—Atwater Kent Co., Wissahicken St. and Abbottsford Rd., plans by Ballinger & Co., 12th and Chestnut Sts., 1 story, basement, 500 x 900 ft., brick, steel radio factory, plain found.

Tex., San Antonio — Alamo Airplane Co., Milam Bldg., airplane factory, incl. runways, 1 or 2 steel hangars, repair shop. $150,000. B. Hammond, Milam Bldg., engr.

Tex., San Antonio—Trust Co., c/o B. Hammond, engr., c/o W. S. Forrester, Travis Bldg., plan 2 story airplane factory, incl. completely equipped machine shops for 3 to 5 planes daily production. $150,000.

Wash., Everett—Puget Sound Pulp & Timber, headed by O. Anderson, 150-ton pulp mill. $3,000,000.

B. C., Westminster—Westminster Paper Co. plant. $1,100,000.

Ont., Galt—PLANT—Dominion Jack & Nail Co. Ltd., plant.

Ont., Hamilton—Boston Insulated Wire & Cable Co. Ltd., Shaw St., 40 x 60 ft. timber factory addition.

Que., Rock Island—Berger Bros., 135 Derby St., New Haven, Conn., factory. $100,000.

Bids Asked

Mass., Everett—See "Contracts Awarded."
Mass., Middleboro—See "Contracts Awarded."

Contracts Awarded

Calif., Los Angeles—K. C. Gillette, 2 story, 102 x 128 ft., steel, rein.-con., factory, Orange St., to R. E. Campbell, 108 West 6th St., $57,350.

Ill., Chicago—L. E. Ritter, archt., Marquette Bldg., masonry and carpentry contract 1 and 4 story, 58 x 73 ft. addition, to Jacobson Bros., 53 West Jackson Blvd., for Goodman Mfg. Co., 4834 South Halsted St. Est. $60,000.

Ia., Sioux City—J. J. Hall, 4619 Morningside Ave., 1 story, 40 x 100 ft. and 35 x 50 ft., brick, tile, for monument works, 3rd and Plymouth Sts., to R. H. Riesdie, 3716 5th Ave. Est. $40,000. Noted May 9 under "Buildings—Industrial."

Mass., Everett — Merrimac Chemical Co., Everett, 1 story, brick, steel factory, plain found., Chemical Lane, separate contracts. $45,000. Private plans.

Mass., Middleboro—Maxium Fire Engine Co., C. L. Maxium, pres. 3 and 4 story, brick factory addition, plain found., separate contracts. $40,000. Private plans.

Mass., Worcester — M. J. Whittall Associates, 2 story, 61 x 250 ft., rug mill, brick, steel, concrete found., to Morton C. Tuttle Co., Park Sq. Bldg., Boston. Est. $175,000.

Mich., Dearborn—Ford Motor Co., Coolidge Hy., 1 story, balcony, 130 x 620 ft. and 120 x 122 ft., brick, steel, rein.-con. airplane factory addition, plain found., to J. W. Butler Constr. Co., 1340 Free Press Bldg., Detroit. Est. $300,000. Noted June 13.

Mich., Detroit—Detroit Butchers Supply Co., 1145 Gratiot Ave., 2 story, brick, steel, rein.-con., plain found., Bellevue Ave., to W. S. Pocock, 1726 Seward Ave. Est. $50,000. Noted July 18.

Mich., St. Joseph—Auto Specialties Co., J. W. Tiscornia, vice pres., Edgewater St., 3 story, brick, rein.-con. factory, to Owen-Ames-Kimball Co., 38 Pearl St. N.W., Grand Rapids. Est. $750,000. Noted May 30.

N. J., Bayonne—L. Shapiro, 311 35th St., North Bergen, 2 story, basement, 70 x 135 ft., brick, steel, rein.-con., plain found., 23 West 25th St., separate contracts. $50,000. M. Krant, 3010 Hudson Blvd., Jersey City, archt. Noted July 25.

N. J., Linden—A. J. Silberstein, archt., 60 Park Pl., Newark, general contract 3 story, basement, brick, steel, factory, plain found., for Elizabeth Avenue Holding Co., c/o archt., to Standard Constr. Co., 972 Broad St., Newark. Est. $40,000. Noted July 18 under "Industrial."

N. J., Newark—H. E. Smith Co., 135 South 15th St., East Orange, general contract, 2 story, basement, brick, steel factory addition, plain found., to V. Polladino, South 15th St. Est. $40,000.

N. Y., College Point—Aero Supply Corp. taking bids separate contracts 1 story, 50 x 137 ft. factory, 22nd St. and 3rd Ave. $40,000. P. Coco, 433 Steinway Ave., archt. Noted July 18 under "Buildings—Industrial."

N. Y., New York—Hosebeth Realty Corp., 119 West 57th St., 3 story, 100 x 125 ft., brick, incl. manufacturing, separate contracts. $200,000. J. M. Felson, 250 West 57th St., archt. Noted May 2.

O., Canton—Hercules Motor Corp., 140 Halwell Pl. S. E., 1 story, brick, steel, concrete factory, 9,000 sq.ft. floor space, to E. J. Landor Co., Renkert Bldg., $100,000. Noted Mar. 15.

O., Youngstown—General Fireproofing Co., 4 story, basement, 90x280 ft. aluminum chair factory, rein.-con., to Rust Eng. Co., Koppers Bldg., Pittsburgh, Pa.

O., Youngstown—McKay Machine Co., 1 story, 34 x 104 ft., brick, steel factory, Rayen Ave., to E. P. Linberger, 830 Market St. Est. $40,000. Noted June 27.

Pa., Phila.—H. C. Aberle Co., A and Lippincott Sts., 1 story, basement, 130 x 137 ft., brick, steel factory, plain found., 13th and Eldererfield Sts., to W. Steele & Son, 15th and Cherry Sts. Est. $100,000.

W. Va., South Charleston—Westwaco Chlorine Products, Inc., group of buildings, brick, steel, concrete, to H. K. Ferguson Co., Hanna Bldg., Cleveland. Est. $1,000,000.

Wis., Racine—Lockwood & Greene & Co., Inc., engrs., 400 North Michigan Blvd., Chicago, Ill., general contract varnish factory, to A. C. Kappel, Racine; plumbing, to J. Feiner, Racine; heating, to Advance Heating Co., Racine; elevator, to Hecter Elevator Co., Racine; ventilating, to H. J. Orting Sheet Metal Co., Racine, for S. C. Johnson & Son, Racine. Est. $150,000.

Ont., Chatham—Hayes Wheels & Forgings Ltd., 240 Raleigh St., masonry contract, 180 x 400 ft. concrete, brick, steel addition, Spencer St., to I. Moore, Ellwood Ave. Est. $200,000.

Ont., London—Scott McHale Shoe Co., J. J. McHale, mgr., 3 story, 50 x 70 ft., 50 x 85 ft. and 1 story, 36 x 50 ft., brick factory, Richmond St., to G. C. Hyatt Bros., 200 Edgerton St., London; steam heating and ventilating, to Bennet & Wright, 81 King St., London. Est. $50,000.

GARAGES

Proposed Work

Conn., Bridgeport—D. W. Flint, lessee, State and West Sts., plans by Fletcher-Thompson, Inc., 542 Fairfield Ave., 2 story, 110 x 300 ft., brick, steel service station. Gilbert and Broad St., $200,000.

Conn., Bridgeport—Adley Co., 947 State St., brick auto service sales station addition, State St., $40,000 or more. Private plans.

Conn., Bridgeport—Model Tire Co., 322 Fairfield Ave., plans by F. J. Dixon, 945 Main St., 2 story, brick service station, John and Fairfield Sts. $50,000. Noted July 4.

Mass., Reading—S. R. Stembridge, 74 King St., 1 story, brick, concrete service and repair garage, plain found., High and Haven Sts. $40,000. Private plans.

N. J., Jersey City—J. Goldenberg, 80 Woodland St., sketches by C. Shilowitz, 26 Journal Sq., 1 story, basement, 110 x 220 ft., brick, steel, rein.-con., incl. gas station, Bergen and Virginia Aves. $150,000.

N. Y., Brooklyn—M. Kraushar, c/o H. J. Nukirk, archt., 44 Court St., 2 story, 100 x 100 brick, Livonia Ave. and Barrett St. $100,000. Maturity after February, 1930. Noted June 20.

N. Y., Brooklyn—Spetsas Realty Corp., J. A. Venetes, pres., 379 Washington Ave., plans by Seelig & Finkelstein, 153 Pierrepont St., altering 1 and 2 story service garage, Bolivar and East Raymond Sts. $60,000 and $100,000 respectively.

O., Dayton—Dayton & Troy Auto Co., 2nd and St. Clair Sts., plans by F. J. Hughes, U. B. Bldg., 1 story, basement, 100 x 220 ft. auto sales and repair building, West Monument Ave. $100,000.

Ont., Windsor—City, plans by W. S. Wilkinson, 243 MacEvans Ave., civic garage, Mercier St., M. E. Brian, city engr.

Que., Metchbetchouan (Lake St. John) — Lac St. Jean Ltd., garage. $50,000.

Que., Montreal—Mount Royal Oil Heating & Equipment Co., Ltd., 1451 Lafontaine Park, garage. $49,000.

Bids Asked

Conn., Norwalk—N. Wessman, 10 Main St., taking bids 2 story, 140 x 150 ft., brick, steel, West Ave. $160,000. Lang & Rosenberg, 110 West 40th St., New York, archts. U. S. Government, lessee.

Mass., Braintree—P. Wynot, Commercial St., taking bids 1 story, irregular sized, concrete, steel service and repair garage, plain found. $40,000 or more. L. S. Joslin, 339 Newbury St., Boston, archt.

N. Y., Brooklyn—M. Chait, 1517 East 35th St., bids about Aug. 1, 2 story, 75 x 100 ft., concrete, Halsey St. and Patchen Ave. $70,000. M. Klein, 65 Court St., archt. Noted Mar. 14.

Mass., Medford—L. Tankle, 109 Myrtle St., Waltham, taking bids 1 story, basement, 80 x 135 ft., brick, stone, steel, service and repair garage, showroom, Mystic St. $45,000. Private plans.

N. Y., New York—See "Contracts Awarded."

Constr. News page 65

Garages (Continued)

Contracts Awarded

Ky., Louisville—Swartz, Clifford & Scott, St. Mathews, 1 story, basement, 113 x 195 ft., steel, rein.-con., garage, Frankfort and Keatts Aves., to George H. Rommel Co., 958 Logan St. Est. $65,000.

Md., Baltimore—F. Thomas, archt., 726 East 33rd St., 1 story, basement, 50 x 200 ft., and 16 x 100 ft., brick, steel, concrete automotive service, for M. J. Barry, Lanvale and Charles Sts., to Thomas Hicks & Sons, 106 West Madison St. Noted July 4.

Md., Baltimore—H. F. Baldwin, archt., 339 St. Paul St., 3 story, basement, 100 x 184 ft., brick, steel, concrete, incl. sales, for Cunliffe-Cadillac Co., Mt. Royal and Charles Sts., to North Eastern Constr. Co., 6 West Madison St., $200,000. Noted July 4.

Mass., Malden—R. C. Clark, 73 Center St., 1 story, 60 x 190 ft., brick, stone service garage, repair shop, showroom, plain found., 105-107 Center St., to L. Antico, 21 Rock Glen Rd., Medford. Est. $50,000. Noted July 4.

Mass., Wayland—Town Bd. Selectmen, 1 story brick, steel, tile service and repair garage, plain found., Cochituate Sect., to Maffei & Gravel Corp., Worcester St., Wellesley. Est. $40,000. Noted July 11.

Mo., St. Louis—Motor Transportation Co., 1803 Park Ave., 1 story, basement, 134 x 150 ft., rein.-con., brick, incl. service station, Spring and Rutger Sts., separate contracts under supervision E. Lantz, 204 Wainwright Bldg., archt. $40,000.

Mo., St. Louis—Western Automobile Co., Washington Blvd., and Euclid Ave., 3 story, rein.-con., brick, terra cotta sales and service, Washington Blvd. and Euclid Ave., to Shasserre Constr. Co., Fullerton Bldg.

N. H., Dover—F. E. Grimes, 1 story, 65 x 170 ft., brick, concrete steel service and repair garage, plain found., to Robie Constr. Co., 99 Elm St., Manchester. Est. $40,000. Noted July 11.

N. Y., Brooklyn—J. Reilly, 2 story, 60 x 131 ft., Bergen St. and 6th Ave., to E. G. Vail, Jr., 189 Montague St. Est. $90,000. Noted Oct. 25.

Tex., San Antonio—Yellow Cab Co., Dolorosa Ave., general contract 1 story, 140 x 160 ft., brick, rein.-con., steel, hollow tile, plain found., to Allen & Allen, Fredericksburg Rd., $70,000. Noted June 6.

SHOPS AND FOUNDRIES

Proposed Work

Calif., Los Angeles—Standard Auto Body Wks., 15th St. and Central Ave., plans by R. D. King, Van Nuys Bldg., 1 story, 97 x 150 ft., brick, steel, shop, also addition to paint shop, 15th St. and Central Ave.

N. Y., Brooklyn — United American Metal Corp., L. Muscat, pres., 59 Paige St., plans by G. Erde, 788 Manhattan Ave., 2 story, 125 x 125 ft. shop, Scott Ave. and Randolph St. $40,000.

Bids Asked

Pa., Phila.—Aug. 8, by Pennsylvania R.R. Co., T. J. Skillman, ch. engr., Broad Street Station, 1 story, basement, 137 x 325 ft. and 23 x 119 ft., brick, steel, electric car shops, plain found., Wayne Junction.

Contracts Awarded

Mass., Chelsea (br. Boston)—Texas Co., 31 St. James Ave., Boston, 1 story, 95 x 135 ft., brick, steel repair shop, plain found., 98-108 Marginal St., to Simpson Bros. Corp., 77 Summer St., Boston. Est. $50,000-$60,000. Noted June 6.

Que., Hull — Hull Iron & Steel Foundries Ltd., foundry, Redempter St., to G. Black, Leaside St., Ottawa. $200,000.

POWER PLANTS

Proposed Work

Ark., Russellville—City, sketches brick, concrete power plant, equipment, distribution lines. $150,000. W. L. Winters, Merchants Bank Bldg., Fort Smith, engr.

Calif., San Francisco—See "Waterworks."

Calif., San Francisco—City and San Francisco Co. plan hydro-electric plant, in connection with Hetch Hetchy water project. $1,000,000. M. M. O'Shaughnessy, city engr.

Kan., Marysville—Kansas Light & Power Co., Marysville, hydro-electric power plant, $200,000. Private plans.

Pa., Phila.—H. J. Levinson, engr., 1621 Sansom St., soon lets contract 2 story, 50 x 100 ft., brick, steel, plain found., laundry and power house, 4804 12th and Market Sts., for Quaker City Laundry, 48th and Locust Sts.

Bids Asked

Conn., Bristol—Aug. 5, by Lockwood Greene Engineer, Inc., engrs., 24 Federal St., Boston, Mass., 1 story, brick, steel, plain found., at general forge plant, for New Departure Mfg. Co., $40,000 or more.

Mass., South Dartmouth — See "Contracts Awarded."

Miss., Cleveland—Aug. 8, by W. C. Trotter, secy. Building Comn., Jackson, boiler plant, outside steam distributing system; sewerage system, disposal plant, water mains at Delta State Teachers' College. C. H. Lindsley, Jackson, engr.

Wash., Tacoma—Aug. 8, by Bd. Contracts & Awards, furnishing labor, materials, equipment, except cement, constructing complete with appurtenance (a) item 1, grading Penstock line, power house site, railroad spur; (b) item 2, surge tank, penstock with appurtenances complete in place for Cushman Power Project in Olympia Mountains.

Contracts Awarded

Conn., Bridgeport—United Illuminating Co., 128 Temple St., New Haven, 1 story, 145 x 175 ft., brick, steel generating plant addition, Steel Point, to E. E. Bray Co., 62 Cannon St., Bridgeport. Est. exceeds $40,000. Noted July 18.

Ky., Louisville — Louisville Gas & Electric Co., 311 West Chestnut St., 2,500 hp. boiler, 250 ft. steel stack and appurtenances, steam electric generating station, 3rd St. and Ohio River, own forces. $500,000. Private plans.

Mass., South Dartmouth—E. H. R. Green, 1 story, brick, steel, power house, plain found., at Round Hills, day labor, F. C. Taylor, in charge, 50 Middle St., Fairhaven.

Mo., St. Louis—Proctor & Gamble Co., 169 East Grand Ave., 1 story, basement, 60 x 90 ft., rein.-con., brick, boiler house, 139 East Grand Ave., to H. K. Ferguson Co., Hanna Bldg., Cleveland, O. Est. $125,000. Noted Apr. 4 under "Buildings Industrial."

N. Y., New York—United Dressed Beef Co., 770 1st Ave., boiler room, oil burning equipment, to Engineer Co., 17 Battery Pl. Est. $40,000. Noted May 30.

Pa., Pittsburgh—Westinghouse Electric & Mfg. Co., East Pittsburgh, substation, 54th and Butler Sts., to B. A. Groah Constr. Co., 847 West North Ave.

Wash., Seattle—Stone & Webster, Stuart Bldg., insulation work in Shuffleton power plant, near Renton, to Asbestos Covering & Supply Co., 84 Marion St., for Puget Sound Power & Light Co., A. W. Leonard, pres., Stuart Bldg. $30,000. Noted May 2.

UNCLASSIFIED

Proposed Work

Calif., Carmel—PRINTING PLANT—L. C. Merrill, c/o Blaine & Olson, archts., 1755 Bway., Oakland, 2 story, basement, rein.-con. $40,000.

Calif., Stockton — ROCK PLANT — Standard Rock Co., Builders Bldg., issuing $200,000 stock, for constructing rock crushing plant. Private plans.

N. J., Harrison—BAKERY—M. Chesney, c/o S. Cohen, archt., 134 Branford Pl., Newark, will not build 2 story, basement, 45 x 100 ft. brick, steel, plain found., Manor and Jersey Sts. $40,000. Project abandoned. Noted Mar. 21.

N. J., Jersey City — COLD STORAGE and WAREHOUSE—Pennsylvania R.R. Co., T. J. Skillman, ch. engr., Broad Street Station, Phila., Pa., plans by G. F. Bial, 145 Summit Ave., Union City, 8 story, basement, 320 x 900 ft., brick, rein.-con., plain found., Hudson River near Exchange Pl. $1,000,000. Noted July 18.

N. Y., Brooklyn—STORAGE and FACTORY —M. Klein, archt., 65 Court St., bids in October, general contract on revised plans storage and factory, Ditmars Ave. and East 89th St., for Royal Show Case Co., 648 Wythe Ave., $40,000. Noted May 16.

N. Y., Long Island City—BAKERY—General Baking Co., 420 Lexington Ave., New York, plans by C. B. Comstock, 110 West 40th St., New York, altering 2 story, 50 x 200 ft., brick, concrete, 92nd St. and 102nd Ave. To exceed $40,000.

N. Y., Long Island City—WAREHOUSE—A. Epstein, archt., 2001 West Pershing Rd., Chicago, Ill., soon takes bids general contract 2 story, rein.-con., for Walgreen Co., 744 Bowen Ave., Chicago, Ill. $85,000. Noted July 11 under "Buildings—Commercial."

N. Y., New York—BOILER ROOM—H. and J. Guttag Corp., J. Guttag, secy., 16 Exchange Pl., plans by H. Tanenbaum, 16 Exchange Pl., 3 story, boiler room, storage, 42 Stone St. and 75 Pearl St. $85,000.

N. Y., New York—BOILER ROOM—G. T. Kirby, 57 East 56th St., plans by S. L. Strauss, 41 Union Sq., altering 125 x 200 ft., brick, concrete, 30 East 57th St. $40,000.

N. Y., New York—BAKERY—Horn & Hardart Co., 600 West 50th St., plans by F. P. Platt, 221 West 57th St., altering, 601 West 49th St. $300,000.

N. Y., New York—PRINTING and NEWSPAPER PLANT—M. T. Rennard, Great Neck, L. I., 3 story, 50 x 115 ft., brick, 101 East 126th St. $100,000. G. S. Williamson, c/o Press Publishing Co., 63 Park Row, engr.

Okla., Blackwell—OIL REFINERY—Cushing Refining & Gasoline Co., sketches enlarging plant $250,000. Private plans.

Okla., Sasakwa—GASOLINE PLANT—Sinclair Oil Co., Sinclair Bldg., Tulsa, sketches 16 unit natural gasoline plant, near here. $75,000. Private plans.

Tenn., Chattanooga—BAKERY PLANT—H. Wasson, Kansas City, Mo., 135 x 165 ft., brick, concrete, 4th and Lyerly Sts. $200,000.

Texas—PACKING PLANT—F. B. Baker & Associates, c/o A. Baker Edinburg, meat packing plant. $100,000.

Tex., Dallas—LAUNDRY—M. Weiss, laundry, Jefferson Ave. and Crawford St. $250,000.

Ont., London—MILK PLANT—Silverwoods Dairies Ltd., A. E. Silverwood, genl. mgr., Bathurst St., plans by F. F. Saunders, 116 Concord Ave., milk handling plant, Bathurst St. $100,000 incl. equipment.

Ont., Toronto — CLEANING PLANT — Babayan's Ltd., 34 King St. E., plans by M. Brown, Confederation Life Bldg., 2 story, 100 x 108 ft., brick, steel, Duke St.

Ont., Toronto—PLANT—Canadian Chewing Gum Ltd., 405 Logan Ave., plans by E. G. Wilson, 60 Bond St., 30 x 70 ft., brick, steel addition.

Ont., Toronto—PLANT—Drug Trading Co. Ltd., 6 Ontario St., 58 x 90 ft., brick, steel addition.

Ont., Toronto—WAREHOUSE, etc.—Firestone Tire & Rubber Co. of Canada, Ltd., 215 Victoria St., plans by Hutton & Souter, 6 James St. S., Hamilton, 2 story, basement, 100 x 100 ft., concrete, brick, steel, warehouse, garage, service and office building, Spadina Ave. $100,000.

Que., St. Hyacinthe—PLANT—Nippon Silk Yarn Co., 99 Cliff St., Paterson, N. J., plant. $150,000.

Que., St. Johns—PLANT—Southern Asbestos Co., plant. $100,000.

Bids Asked

N. J., Oradell—HEATING PLANT—Aug. 19, by Bergen Co., M. Harkness, clk., Hackensack, and H. R. Kent, engr., 5 Erie Ave., Rutherford, central heating plant. $150,000. C. V. R. Bogert, 210 Main St., Hackensack, archt.

N. J., Paterson—SILK HOSIERY PLANT—Enbro Corp., archts., 111 Academy St., Newark, bids about Oct. 1, general contract 3 story, basement, 56 x 185 ft., brick, rein.-con., plain found., for Owner, c/o architects. $75,000. Noted June 20.

Tex., Tenaha—COMPRESS—See "Contracts Awarded."

Ont., Toronto—RUG CLEANING PLANT—Babayans Ltd., 34 King St. E., taking bids 2 story, basement, 100 x 108 ft., concrete, brick, Duke and George Sts. $100,000. M. Brown, Confederation Life Bldg., archt.

Contracts Awarded

Conn., Waterbury—PLANT—Scoville Mfg. Co., 99 Mill St., 4 story, 25 x 165 ft., brick, stucco addition, Silver St., to Tracy Bros., Co., 52 Benedict St. Est. $45,000.

Ill., Chicago—BAKERY—Michaelson & Rognstad, archts., 3256 Franklin Ave., 3 story, 4430 North Clark St., to O. W. Rosenthal Cornell Co., 228 La Salle St., for Cushman Sons, Inc., 1138 Bryn Mawr Ave. Est. $250,000.

Mass., Somerville (br. Boston)—ROUNDHOUSE, etc.—Boston & Maine R.R., W. J. Backes, ch. engr., Boston, 1 and 2 story roundhouse, terminal, incl. 110 x 160 ft., store and office, 90 x 110 ft. machine shop, 45 x 70 ft. office, 110 ft. turntable pit, to Tredennick-Billings Co., 10 High St., Boston, est. $1,500,000; concrete piles, to Raymond Concrete Pile Co., Statler Bldg., Boston, est. $25,000. Noted July 4.

Mo., St. Louis—BAKERY—St. Louis Bread Co., 1202-06 North Kingshighway, general contract 2 story, basement, 50 x 90 ft., rein.-con., brick, North Kingshighway, to Bond Finance & Constr. Co., 411 Louderman Bldg. Est. $60,000. Plumbing, to C. Moynihan & Sons, 2007 Olive St.; heating, ventilating, to Sodemann Heat & Power Co., 2306 Morgan St.

N. J., Pompton Lakes—GAS DISTRIBUTING PLANT—Pub. Serv. Electric & Gas Co., 80 Park Pl., Newark, general contract 2 story basement, brick, steel, plain found., Junction St., to C. Alberg Constr. Co., 168 Washington Ave., Hawthorne. Est. $75,000.

N. Y., Buffalo—WAREHOUSE and SUPERSERVICE STATION—Lockwood Greene Engineers, Inc., engrs., 100 East 42nd St., New York, general contract, steel, brick, art stone branch warehouse and super-service station, Main St. and Woodland Ave., to John W. Cowper Co., Inc., M. & T Bldg., for Firestone Tire & Rubber Co., South Main St., Akron, O.

O., Cleveland — LABORATORY — Industrial Rayon Corp., 9801 Walford Ave., 2 story, basement, 60 x 140 ft., brick, steel, concrete, 9801 Walford Ave., to G. A. Rutherford Co., 2725 Prospect Ave. Est. $50,000.

Okla., Altus—COTTON COMPRESS—Frederick Compress Co., G. R. Flynn, supt., Frederick, 1 story, 380 x 482 ft., concrete. $100,000. Day labor. M. A. Joy, Altus, archt.

Pa., Phila.—STORAGE—Pennsylvania R.R. Co., T. J. Skillman, ch. engr. Broad Street Station, 3 story, basement, 50 x 260 ft., brick, rein.-con., plain found., 32nd St. north of Market St., to United Engrs. & Constrs. Co., 112 North Broad St. Est. $200,000.

Tex., Crystal City—ICE STORAGE, etc.—Central Power & Light Co., Frost Bank Bldg., San Antonio, 55 ft. high, 60 x 110 ft. ice storage building, concrete, 15 ft. high, 12 x 116 ft. wing, to Sumner-Sollitt Co., Natl. Bank of Commerce Bldg., San Antonio. $60,000.

Tex., La Feria—PACKING PLANT—Texas Citrus Fruit Growers Exchange, c/o J. Shary, Mission, 1 story, basement, 96 x 125 ft. plant, to J. E. Walsh, Mission. $47,470. Noted July 4.

Tex., Tenaha — COMPRESS — Tenaha Compress & Warehouse Co., c/o R. Jones, pres., 1 story, 90 x 120 ft., timber, concrete, own forces. Equipment to Webb Compress Co., Linden, La., $50,000. Total est. $65,000. Private plans.

Ont., Toronto—LAUNDRY—Brighton Laundry Ltd., 826 Bloor St. W., general contract 2 story, basement, concrete, brick, steel addition, to Grattons Ltd., 486 Clinton St.; structural steel, to John T. Hepburn Ltd., 18 Van Horne St. Est. $100,000. Noted July 11.

See proposal advertising on page 145

Constr. News page 66

UNIT PRICES

Unit Price Lists Published in July, 1929

		Issue of
Bridge	Pennsylvania	July 4
Bridge	Texas	July 25
Conduit	Albany, N. Y	July 4
Foundations for Bridge Plaza	Washington, D. C	July 18
Paving	Bentonville, Ark	July 11
Pier	Waukegan, Ill	July 11
Power Tunnel	Seattle, Wash	July 4
Road	Kentucky	July 4
Road	Texas	July 11
Sewer	Syracuse, N. Y	July 11
Sewerage System	San Diego, Calif	July 11
Street Improvement	Knoxville, Tenn	July 25
Substructure for Pumping Plant	Detroit, Mich	July 18

Bridge—Seattle, Wash.

Board of Public Works opened bids May 3, rein.-con. and steel viaduct over Harbor Avenue S.W., in connection with grade separation project. Fifteen bids were received, difference between lowest and average, 7 per cent. Lowest three and highest bidders are: (A) Hans Pederson, 1105 Second Ave., (awarded contract); (B) Pacific States Construction Co., Lloyd Bldg.; (C) L. Romano & Powers, 123 23rd St., S.; (D) J. F. Ward, Inc.

	A	B	C	D
Clearing (lump sum)	$4,200.00	$6,000.00	$2,000.00	$2,500.00
1,148 cu.yd. excav.	3.50	2.00	10.00	2.45
40,000 cu.yd. embankment	0.43	0.50	0.50	0.335
3,120 cu.yd. concrete	16.70	16.00	15.00	20.50
541,500 lb. reinf. steel	.04	.0375	.04	.04
9,130 lin.ft. timber piles	.58	.53	.30	.54
1,680 lin.ft. conc. piles	2.40	2.00	4.00	2.20
300 lin.ft. test piles for timber piles	.90	1.00	.50	1.00
200 lin.ft. test piles for conc.piles	.90	1.70	.50	1.00
1,637 lin.ft. conc. rail	3.10	2.00	4.00	7.25
1,000 lin.ft. wood rail	.73	.75	.50	.52
264 lin.ft. pipe rail	4.90	4.00	2.00	3.70
11 standard inlets	20.50	24.00	20.00	25.00
5 bridge inlets	53.00	40.00	50.00	40.00
290 lin.ft. 4 in. wrought steel pipe	2.65	2.20	1.00	2.00
50 lin.ft. 4 in. c.i. pipe	2.55	2.00	1.00	2.00
460 lin.ft. 6 in. cast steel pipe	.95	.80	1.50	.75
614 lin.ft. 8 in. cast steel pipe	1.10	1.00	1.75	.90
17 catch basins	89.00	90.00	90.00	80.00
1 manhole	115.00	165.00	100.00	50.00
190 lin.ft. 30 in. c.i. pipe sewer	11.50	35.00	10.00	35.00
85 lin.ft. 8 in. c.i. pipe sewer	2.20	15.00	2.00	16.50
2 manholes	85.00	125.00	80.00	116.00
8.6 M. ft. b.m. wood walks	36.00	45.00	50.00	30.00
159 M. ft. b.m. trestle lumber	52.00	57.00	60.00	55.00
11 steel bridge lamp posts	39.00	45.00	40.00	43.00
11 steel bridge lamp posts furn.	51.00	50.00	42.00	49.00
7 lamp posts, Type "B"	41.00	45.00	40.00	43.00
7 lamp posts, Type "B" furn.	53.00	55.00	55.00	53.00
1 warning beacon, "A"	140.00	150.00	135.00	150.00
1 lamp post for warning beacon "B"	50.00	55.00	46.00	57.00
1 lamp post furnished for warning beacon, "B"	68.00	70.00	70.00	65.00
6 lamp posts for stairs	11.00	11.00	10.50	10.00
Lamp posts furn. for stairs	61.00	60.00	60.00	58.00
1 warning signal	30.00	30.00	30.00	28.00
4 lights for lower road	14.50	15.00	15.00	14.00
Conduits (lump sum)	1,115.00	1,140.00	1,098.00	1,050.00
Wiring (lump sum)	450.00	482.00	420.00	440.00
Transformer and connection	220.00	225.00	206.00	206.00
25,650 lb. structural steel	.07	.08	.10	.095
30 lin.ft. 16 in. c.i. pipe sewer	5.90	17.00	8.00	16.00
Totals	$138,208	$140,975	$142,640	$154,565

Engineering News-Record, Issue of August 1, 1929

Sewage Disposal Works—Newton, Kan.

City opened bids Apr. 16 improving sewage disposal works. Nine bids were received, difference between lowest and average 13 per cent. Lowest three and highest bidders are: (A) E. W. Baker & Co., Oklahoma City, Okla., (awarded contract); (B) H. J. Petersen Co., Omaha, Neb.; (C) W. B. Carter, Tulsa; (D) Stanton & Wallace, Leavenworth, Kan. Black & Veatch, 700 Mutual Bldg., Kansas City, Mo., engineers.

	A	B	C	D
5,400 cu.yd. excav. above elev. 1,400.0	$0.40	$0.40	$0.90	$1.00
100 cu.yd. excav. below elev. 1,400.0	3.40	1.50	2.00	5.00
300 cu.yd. excav. for pipe lines	.68	1.00	1.20	2.00
5 cu.yd. class D conc. backfill	10.30	15.00	12.00	20.00
Alterations and additions to flood control manhole (lump sum)	2,200.00	2,400.00	2,380.00	3,000.00
Alterations and additions to Imhoff tank and pumping station (lump sum)	10,300.00	10,200.00	7,950.00	9,000.00
Dosing tank (lump sum)	2,500.00	2,500.00	1,975.00	3,000.00
Sprinkling filter additions (lump sum)	26,150.00	27,677.00	28,700.00	35,000.00
Alterations and additions to resettling tank (lump sum)	3,550.00	3,560.00	3,850.00	3,050.00
Sludge digester	6,400.00	7,800.00	7,800.00	10,000.00
Alterations and additions to sludge drying beds (lump sum)	1,400.00	1,150.00	1,500.00	1,500.00
110 lin.ft. 14-in. cast iron pipe	2.72	4.20	4.40	4.00
20 lin.ft. 8-in. cast iron pipe	1.36	3.20	3.00	2.00
300 lin.ft. 6-in. cast iron pipe	.91	1.35	1.50	1.25
130 lin.ft. 2-in. vit. clay sewer	2.18	2.10	3.00	2.00
40 lin.ft. 15-in. vit. clay sweer	1.25	1.25	2.00	1.25
Surface drainage manhole	90.00	100.00	75.00	35.00
Standard manhole	90.00	85.00	125.00	60.00
5 cu.yd. class B conc	13.60	25.00	14.00	25.00
Totals	$56,436	$59,536	$61,369	$72,485

Engineering News-Record, Issue of August 1, 1929

Paving—Chicago, Ill.

Cook County Commission, 139 North Clark St., opened bids paving Riegel Road from Joe Orr Road to Homewood-Lansing Road, 20 ft. pavement. Lowest three and highest bidders are: (A) States Improvement Co., 160 North La Salle St., (awarded contract); (B) John Mackler & Co.; (C) J. M. Pierson & Co.; (D) Pronger Bros. A. Quinlan, superintendent of highways.

	A	B	C	D
43,180.7 sq.yd. conc. paving	$1.95	$1.99	$1.99	$2.10
36,813 sq.yd. earth shoulders	.17	.20	.20	.15
26,381 cu.yd. excav. "A"	.85	.70	.80	.83
7.8 cu.yd. class "X" conc	60.00	50.00	50.00	40.00
200 cu.yd. excav. "C"	2.50	5.00	4.00	3.00
1,949 cu.yd. borrow	1.50	1.50	1.50	1.30
400 lin.ft. vit. pipe 24 in.	3.50	4.00	4.00	4.00
92 lin.ft. vit. pipe 15 in.	2.00	2.00	2.50	3.00
92 lin.ft. vit. pipe 12 in.	1.50	1.50	1.00	2.00
399 lin.ft. vit. pipe 15 in.	2.50	3.00	4.00	1.50
333 sq.ft. part tile pipe	.35	.50	.20	.30
60,010 lb. rein. steel culverts	.06	.05	.05	.06
442.78 cu.yd. plain conc. "A"	27.50	30.00	30.00	30.00
200 lin.ft. guard fence	1.00	1.00	1.00	1.00
4 section markers	25.00	25.00	20.00	20.00
2 bridge name plates	50.00	35.00	10.00	25.00
1 catch basin	50.00	100.00	75.00	50.00
481 lb. wire mesh reinf.	.25	.10	.05	.20
2 sign posts	150.00	100.00	125.00	140.00
85.2 cu.yd. hard pave. removal	1.00	2.00	2.00	4.00
100 cu.yd. stone	3.00	3.00	3.00	2.50
1.6 M ft. b.m. barricades	65.00	100.00	100.00	100.00
1,592 lb. cast iron rockers	.10	.10	.10	.20
456 lb. steel bear plates	.10	.10	.10	.20
68 sq.ft. bituminous felt	.30	.20	.25	.10
Totals	$136,974	$137,209	$139,880	$144,304

Engineering News-Record, Issue of August 1, 1929

UNIT PRICES Continued on Page 82

UNIT PRICES

Canal—Vale, Ore.

Bureau of Reclamation, Department of Interior, opened bids June 14, earthwork, tunnels and structures on Vale Main Canal, Vale Project, 16.5 mi. Lowest three and highest bidders are: (A) W. H. Puckett, Boise, Idaho, (awarded contract); (B) Utah Construction Co., Ogden; (C) S. H. Newell & Co., Portland; (D) Nevada Contracting Co., Fallon, Nev. Successful contractor will deduct $5,000 from final estimate for being awarded three schedules. H. W. Bashore, construction engineer.

	A	B	C	D
110,000 cu.yd. excav. of canal, class 1	$0.10	$0.12	$0.22	$0.14
235,000 cu.yd. excav. of canal, class 2	.24	.26	.22	.45
82,000 cu.yd. excav. of canal, class 3	.65	.95	.88	1.10
5,000 sta. cu.yd. overhaul	.03	.03	.10	.10
2,000 cu.yd. excav for structure, class 1	.25	.30	.60	.75
5,000 cu.yd. excav for structure, class 2	.35	.50	1.00	1.25
1,000 cu.yd. excav for structure, class 3	.90	1.75	3.00	3.00
500 cu.yd. excav. for roads around tunnels, class 1	.15	.30	.30	.30
1,500 cu.yd. excav. for roads around tunnels, class 2	.25	.45	.60	.60
2,500 cu.yd. excav. for roads around tunnels, class 3	.80	1.60	1.00	1.00
5,500 cu.yd. excav. of drainage channels for culverts and wasteways, class 1	.12	.20	.15	.30
500 cu.yd. excav. of drainage channels for culverts and wasteways, class 2	.30	.40	.50	.60
200 cu.yd. excav. of drainage channels for culverts and wasteways, class 3	1.00	1.50	2.00	1.50
3,600 cu.yd. excav. of tunnels	4.75	7.00	6.00	11.00
5 cu.yd. excav. of trenches for longitudinal drain pipe for tunnels, class 1	1.00	.80	1.00	1.00
5 cu.yd. excav. of trenches for longitudinal drain pipe for tunnels, class 2	2.00	2.00	2.00	2.00
35 cu.yd. excav. of trenches for longitudinal drain pipe for tunnels, class 3	3.00	5.00	8.00	3.00
5 cu.yd. excav. of trenches for lateral drain pipe from tunnels, class 1	.50	.80	1.00	1.00
150 cu.yd. excav. of trenches for lateral drain pipe from tunnels, class 2	1.00	2.00	1.00	2.00
25 cu.yd. excav. of trenches for lateral drain pipe from tunnels, class 3	2.00	5.00	3.00	3.00
140 cu.yd. excav of temporary roadway at bridge, class 1	.15	.25	.30	.30
100 cu.yd. excav. of temporary roadway at bridge, class 2	.30	.45	.60	.60
10 cu.yd. excav. of temporary roadway at bridge, class 3	1.50	1.75	2.00	1.50
2,500 cu.yd. backfill about structures	.25	.25	.30	.60
1,000 cu.yd. tamping backfill about structures	.40	.20	.50	.50
40 cu.yd. gravel backfill around drain pipe	3.00	2.50	4.00	4.00
860 lin.ft. laying 6-in. drain pipe with uncemented joints	.20	.20	.20	.30
200 lin.ft. laying 6-in. drain pipe with cemented joints	.30	.30	.30	.50
80 lin.ft. laying 12-in. conc. pipe for turnouts	.30	.50	.40	.80
120 lin.ft. laying 15-in. conc. pipe for turnouts	.40	.60	.50	2.00
40 lin.ft. laying 18-in. conc. pipe for turnouts	.75	.80	.60	2.00
120 lin.ft. laying 24-in. conc. pipe for turnouts	1.00	1.00	.80	3.00
7 M.ft.b.m. erecting timber in bridge	30.00	25.00	25.00	50.00
22 M.ft. b.m. furnishing and erecting permanent timbering in tunnels	80.00	55.00	70.00	90.00
1,100 cu.yd.conc. in structures, including open and closed tunnel transitions	17.00	18.00	20.00	22.00
820 cu.yd. conc. in tunnel lining	10.00	12.00	7.00	20.00
90,000 lb. placing reinforcement bars	.03	.02	.03	.025
13,000 lb. installing gates, gate lifts, stop plank guides, and metal railing	.10	.06	.05	.10
Totals Schedule No. 1	$179,418	$224,567	$227,891	$318,359
237,000 cu.yd. excav. of canal, class 1	.10	.31	.19	.14
338,000 cu.yd. excav. of canal, class 2	.25	.31	.19	.14
127,000 cu.yd. excav. of canal, class 3	.75	.31	.90	1.10
70,000 sta. cu.yd. overhaul	.03	.03	.04	.10
500 cu.yd. excav. for structures, class 1	.25	.30	.60	.75
3,000 cu.yd. excav. for structures, class 2	.35	.50	1.00	1.25
3,000 cu.yd. excav. for structures, class 3	.90	1.50	3.00	3.00
500 cu.yd. excav. of drainage channels for culverts, class 1	.20	.20	.40	.30
500 cu.yd. excav. of drainage channels for culverts, class 2	.40	.40	.40	.60
200 cu.yd. excav. of drainage channels for culverts, class 3	1.00	1.50	2.00	1.50
2,000 cu.yd. backfill about structures	.25	.25	.30	.60
1,000 cu.yd. tamping backfill about structures	.40	.20	.50	.50
40 lin.ft. laying 15-in. conc. pipe for turnouts	.50	.60	.50	2.00
40 lin.ft. laying 18-in. conc. pipe for turnouts	.70	.80	.60	2.00
450 cu.yd. conc. in structures	17.00	18.00	20.00	22.00
35,000 lb. placing reinforcement bars	.03	.02	.03	.025
3,000 lb. installing gates, gate lifts, stop plank guides and metal railing	.10	.06	.05	.10
Totals Schedule No. 2	$219,875	$236,206	$250,794	$358,790
68,000 cu.yd. excav. of canal, class 1	.10	.12	.20	.14
197,000 cu.yd. excav. of canal, class 2	.25	.28	.20	.45
6,000 cu.yd. excav. of canal, class 3	.70	.80	1.50	1.10
5,000 sta. cu.yd. overhaul	.03	.03	.04	.10
6,000 cu.yd. excav. for structures, class 1	.15	.25	.80	.75
8,000 cu.yd. excav. for structures, class 2	.30	.40	.80	1.25
1,000 cu.yd. excav. for structures, class 3	.90	1.50	2.00	3.00
24,000 cu.yd. excav. of drainage channels for culverts and wasteway, class 1	.12	.18	.35	.30
15,500 cu.yd. excav. of drainage channels for culverts and wasteway, class 2	.25	.35	.35	.40
100 cu.yd. excav. of drainage channels for culverts and wasteway, class 3	1.00	1.50	2.00	1.10
3,500 cu.yd. backfill about structures	.25	.25	.30	.60
2,000 cu.yd. tamping backfill about structures	.40	.20	.50	.50
40 cu.yd. gravel backfill around drain pipe	2.00	2.50	4.00	4.00
300 cu.yd. back protection	2.00	3.00	2.00	3.00
840 lin.ft. laying 6-in. drain pipe with uncemented joints	.20	.20	.20	.30
65 lin.ft. laying 4-in. drain pipe with cemented joints	.30	.20	.20	.30
40 lin.ft. laying 15-in. concrete pipe for turnouts	.50	.60	.50	2.00
40 lin.ft. laying 24-in. concrete pipe for turnouts	1.00	1.00	.80	3.00
1,100 cu.yd. conc. in structures	16.50	18.00	20.00	22.00
89,000 lb. placing reinforcement bars	.03	.02	.03	.025
13,000 lb. installing gates, gate lifts, stop plank guides, and metal railing	.10	.06	.05	.10
Totals Schedule No. 3	$96,178	$109,245	$117,788	$138,637
Grand totals	495,470	570,018	596,473	815,786

Engineering News-Record, Issue of August 1, 1929.

Constr. News page 68